



Demystifying Databases
Putting SQL server technology in perspective. See page 549



MS-DOS 5.0
We review the update to the industry-leading OS. See page 61

Rivals IBM, Apple team up for open platform

Allies look to recapture old dominance

By KRISTI COALE
AND ED SCANNELL

IBM and Apple—spectators over the last few years as Microsoft has come to dominate the market—are positioning themselves to once again be the standard bearers for the computer industry.

IBM is proposing to be Apple's full partner in developing an open platform and operating system based on the Power PC, the chip used in IBM's RS/6000, and the Pink operating system, which other vendors will support. Basically, it is an attempt at self-determination.

"IBM must come up with a workable plan to stave off the clones, otherwise its future will

See **ALLIES**, page 6

Agreement lays groundwork for joint development

Joint venture for object-oriented software

Apple and IBM will form a jointly owned and independently managed software company to develop, market, and license an object-oriented, platform-independent operating system.



Macintosh integration into IBM's Enterprise systems

Networking products that enable Macs to operate in the IBM Enterprise environment and an enhanced AIX will be developed with Mac toolbox, giving it the capability of running Macintosh software.

New markets for the IBM Power RISC architecture

Apple will use future single-chip implementations of IBM's RS/6000 Power architecture, manufactured by Motorola, in future Macintosh machines, and both companies will use these chips in workstations and file servers running the new AIX.

Common multimedia platforms for the Industry

Platform-independent software environments will be created and licensed to simulate industry multimedia development.

Joint venture formed for cross-platform OS

By TOM QUINLAN

Apple Computer Inc. and IBM Corp. joined forces last week to closely integrate their existing products and to develop a new operating system that will work with Intel Corp., Motorola Corp., and IBM RISC microprocessors.

If a letter of intent signed by the two companies on July 3 is fully ratified, a third company formed by IBM and Apple and independently operated would create, market, and license a platform-independent, object-oriented operating system.

The new operating system will be based on Apple's existing Pink project and will be available to other manufacturers. Motorola is a junior partner in the effort, pledging to manufacture and sell a single-chip version of IBM's Power Chip, currently used only in the RS/6000.

With those pieces in place, the agreement could allow Apple and IBM to form a new standard for the 1990s, one capable of competing against the Advanced Computing Environment (ACE) Initiative, for which Microsoft is providing the operating system component.

"I'd be much more interested in what Apple and IBM will develop than I would in what ACE comes up with," said Joe Kua, president of Arche Technologies. (See related story, page 8.)

Even if the future alliance falls short of its all-encompassing goals, each company can expect to walk away with something.

Apple and IBM are seeking additional agreements in three areas.

These agreements would result in a new version of IBM's See **JOINT VENTURE**, page 6

Notebooks crack under stress, suffer from flimsy construction

By NICO KROHN
AND MARK BROWNSTEIN

Notebook-size computers are all the rage this year, but some dealers and corporate buyers have found they're not all they're cracked up to be.

Buyers and dealers report fractured cases, port doors that break or pop out, and displays that fail because of the flimsiness of their plastic casings. Many popular notebooks, including Compaq's LTE 386s/

20, Sharp's 6220, and AT&T's Safari, suffer from these problems, they say. Some problems are merely irksome, while others make the machines unusable.

A major computer dealer in New York said several Sharp Electronics Corp. 6220, Texas Instruments Inc. Travelmate 2000, and AT&T Safari notebooks have been returned with nonfunctioning displays.

"The panel gets crushed in the process of overstuffing a

See **NOTEBOOKS**, page 103

Microsoft drops OS/2 2.0 API, revamps 32-bit Windows plans

Users face choice between OS/2 and Windows NT

By STUART J. JOHNSON

Microsoft has veered away from OS/2 and will ship next year Windows NT, its 32-bit New Technology operating system, with only Windows and DOS programming interfaces, the company confirmed last week.

The company has shifting gears on its commitment to OS/2 last summer on the heels of the explosive success of Windows 3.0.

Previously, Microsoft said the New Technology (NT) kernel would be the core component of OS/2 3.0—a pure 32-bit version of OS/2 that would run code written for DOS, 16-

"The OS/2 API... could ship as a separate module."

Steve Ballmer

and 32-bit Windows, and 16- and 32-bit OS/2 applications programming interfaces (API).

However, now the company plans not to include OS/2 API support; instead it will concen-

trate on Windows, said Steve Ballmer, Microsoft senior vice president of systems software.

"The OS/2 API is something we could ship as a separate module to help OS/2 customers come back to Windows NT," Ballmer said. "OS/2 3.0 is the thing we're building under contract from IBM."

The decision clearly means that users will be confronted with the difficult choice of buying OS/2 or committing to Windows long term.

In January, Microsoft broadly hinted it was leaning toward abandoning its OS/2 path when executives described a concept

See **MICROSOFT**, page 103

Borland ranked best Quattro Pro beats Lotus 1-2-3

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Number of ...	3.0	v. 2.3 v. 3.1
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"Very Good"	8	4 5
"Good"	0	5 4
"Satisfactory"	2	5 3
"Poor"	0	1 1
Overall score	8.4	6.3 6.5

We don't blame Lotus for trying to underplay ratings such as these, but clearly Quattro Pro is more powerful. It has better graphics, better capacity, better macros, better consolidation and linking, and much more!

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REPORT CARD INFO WORLD

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Quattro Pro
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Macros (50) Very Good

Consolidation/linking (50) Excellent

Capacity (50) Very Good

Networking (50) Satisfactory

Documentation (75) Excellent

Ease of learning (50) Excellent

Ease of use (100) Very Good

Error handling (50) Very Good

Support

Support policies (25) Very Good

Technical support (25) Satisfactory

Value (100) Excellent

Final score 8.4



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NEWS

Novell forms business unit to focus on Unix systems

BY KARYL SCOTT

Novell Inc. last week announced the formation of a new business unit designed to focus the company's attention on Unix networking and enterprise systems in addition to its traditional PC-based NetWare business.

The as-yet unnamed Unix business unit comes largely in response to user demands that Novell make more effort to tie NetWare networks into their existing Unix and TCP/IP systems.

The announcement illustrates Novell's realization that it must advance its technology to provide customers with more sophisticated enterprise-wide systems. The typical NetWare installation today is still only about 100 nodes.

"We are seeing our business

transformed in the large enterprise-systems environment," said Kanwal Rekhi, Novell executive vice president for product development.

"We're seeing more Unix systems than ever before, and customer emphasis is on downsizing host applications to LAN-based client/server platforms," Rekhi said.

The new business unit will consist of engineering and marketing personnel. It will not have a separate sales force.

Rumors that Novell also has plans to form a business unit to support IBM's NetWare reselling efforts are untrue, according to Rekhi. Novell's core NetWare business unit will continue to handle the marketing and development relationship with IBM for the time being, he added.

Word for Mac has interface similar to Word for Windows

BY LOUISE FICKELE

An upcoming version of Microsoft Word for Macintosh packs in new features and sports an interface that resembles Word for Windows, sources said.

"The redefined interface makes it much more visual," said a member of a Microsoft users' group in California. "They've taken the print/merge command, and they walk you through it."

New features in Word 5.0—which the Redmond, Washington, company is in the early stages of beta testing—include Find File, which lets users search for documents and their contents by such attributes as title, file kind, and date created. The Find command search-

es, or searches and replaces, by text and formatting attributes and special characters.

Word 5.0 for Macintosh will support System 7.0's Publish and Subscribe, TrueType, and balloon help. Microsoft has also added an AppleEvent, called Edit Object, that starts a selected object's application so that the user can change it. Those changes are then copied into the Word document.

The ribbon toolbar above the rule has options for text formatting, drawing tools, and column creation. The draw capability lets users create and edit drawings from within Word and supports eight colors.

Users can use the Preferences dialog box to specify the default font and tell the program to

back up files automatically. Users can also set the box so that Word will remind them to back up their files periodically.

Other features include an enhanced spelling checker, a grammar checker, a thesaurus, and a macro feature.

"Interface improvements will make [low-end and mid-range users very happy]," said one beta tester. Although he liked the upgrade, its interface stopped a little short of what he would have liked, he said.

"It's close to Word for Windows. I would have preferred their going a little further beyond [Word for Windows]," he said.

Microsoft declined to comment on the unannounced product.

PC price cuts spur corporate purchases

BY LAURIE FLYNN

Lower PC prices and growing optimism about the economy are prompting some corporate IS managers to step up their purchases of PC equipment.

In a telephone survey of 100 **MARKET ANALYSIS** *InfoWorld* readers who buy an average of 500 personal computers per year, 43 percent of the respondents said that recent price cuts by IBM, Compaq, and others are having an impact on their

companies' equipment purchases. Of those, 57 percent are buying more PCs, while 33 percent said they are now able to buy more powerful equipment.

"There is definitely some increase in activity," said Bill Cornfield, president of the New York-based Windows Support Group. Some of his clients had put off purchases expecting price drops and then made large purchases once the lower prices were announced.

Amoco Inc. is able to buy more PCs as a result of the price cuts, but because of a fixed budget has not increased the

dollar amount. "We've seen some changes in volume but the price cuts aren't going to see us increase our overall spending," said John Chapman, manager of strategic systems at the Chicago-based oil giant.

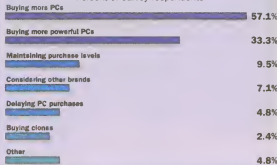
Since April, IBM has cut its PC prices an average of 15 percent; Compaq an average of 25 percent; and ALR an average of 14 percent. Everex, AST, Dell, and Hewlett-Packard also announced price cuts during the period.

The vast majority of survey respondents—84 percent—

See PRICE CUTS, page 6

Lower PC prices drive sales

Percent of survey respondents



SOURCE: INFOWORLD/FRS1 MARKET RESEARCH

Microsoft extends OS/2 licenses to IBM's 2.0

Microsoft Corp. last week extended contracts to companies licensing OS/2 1.3, allowing them to sell Version 2.0 when IBM ships it later this year. The extension will allow Microsoft licenses to ship the same version of OS/2 that IBM ships. Users will be able to run OS/2 Extended Services/2 and OfficeVision from non-IBM machines, Microsoft officials said.

—Yvonne Lee

Frye Computer offers directory for NetWare

Frye Computer Systems of Boston, plans to announce its LAN Directory for NetWare this quarter. The inventory tool will help network administrators automate the process of tracking hardware and software on client workstations and servers, track file and card changes, and

distribute software updates over the network. Pricing is not yet available.

—Karyl Scott

Twinhead joins the club of PC price reducers

Twinhead Corp. last week cut prices between 5 and 20 percent on selected desktop, portable, and desksize computers to better compete with compatible vendors. Twinhead cut prices in its Superset, Supernote, and Superlap lines. The largest reductions were in its Superset 600/425 system, based on the 25-MHz 486 chip, and the Superset 800/33C, based on the 486 chip. Both were cut by \$600, to \$3,599 and \$2,899, respectively. The company lowered the prices of its low-end 386SX machines by \$300. The new prices are effective immediately.

—Tuseda A. Griggs

AT DEADLINE

Tiara Computer ships token ring adapters

Tiara Computer Systems, based in Mountain View, California, released five new token ring adapters in its line of LanCards, including two that operate at 16 megabits per second (mbps). The company also announced a driver for IBM PC LAN software as well as a Type 3 Media Filter. The 16/4-mbps token ring adapters are available for ISA or Micro Channel configurations.

—Laurie Flynn

Central Point, Norton support System 7.0

Bursting out of the System 7.0-aware gate in almost a dead heat, Beaverton, Oregon-based Central Point Software and Cupertino, California-based Symantec

Corp. are now shipping the latest versions of their integrated utilities packages—MacTools Deluxe 1.2 and Norton Utilities for the Macintosh 1.1, respectively. Both products support balloon help and the Finder's drag-and-drop function, and can recognize bad blocks on volumes initialized with System 7.0. Differences exist between the two products. Each lists for \$129, upgrades are available for \$19.

—Leslie Feldman

Datapoint sells Wyse's multiprocessing PCs

Datapoint Corp. has announced it will begin reselling Wyse Technology Inc.'s multiprocessing 386- and 486-based servers running Unix System V, Release 4, primarily to markets outside of the United States. Terms of the agreement were not disclosed, although Datapoint said it expects to begin quantity shipments in September.

—David Courtney

EDITORIAL

Does the Apple deal mean IBM's made up its mind?

Many people are struggling with the significance of the two largest, most proprietary companies in the personal computer business doing business with one another. Even the companies themselves don't really seem to know what they are trying to accomplish. And when the parties to a deal are unclear about their objectives, it makes it hard to understand its import. We believe there are two important aspects to highlight:

1) We hope that IBM has finally decided what to do. The truth of the matter is that IBM has failed to understand the personal computer and further failed to understand the importance of the PC. IBM's lack of engagement on this subject has produced a situation whereby it created a gigantic marketplace and then proceeded to lose as much as 80 percent of the marketplace to more savvy, more willing participants.

IBM has focused more and more on finding other partners to work with on defining new platforms for technology. The company has made deals with Next Inc., Metaphor Computer Systems, and the Open Software Foundation, among others, producing the possibility of four or five different operating systems that would work on its RS/6000 platform, some of which would also work on its PS/2 platform.

For the good of the customers, IBM has got to stop playing footsie with every likely partner who comes along and commit itself to a particular development strategy. We can see that working on OS/2 2.0 for PS/2s in the short term and the Apple/IBM object-oriented platform in the long term makes sense, but IBM has got to publicly abandon its former misguided attempts and stop pretending that its software programs can work on any system and on any machine.

2) IBM is clearly endorsing Apple's accomplishments. For years, Apple has struggled to gain credibility as a systems supplier — not because its technology was bad or the company had done a poor job of developing or implementing it, but simply because its products were exclusive to Apple.

IBM has finally come to believe that Apple's technical accomplishments are worth adopting. IBM's technical credibility is marginal at this point. But it is worth noting that Apple has built the kind of technical credibility that gets the world's leading computer company to change strategies midstream to cooperate with it. And that is endorsement enough for a lot of naysayers in the computer business to stop beating up on Apple simply because it is focused more on making good products than on making good politics.

—Stewart Alsop

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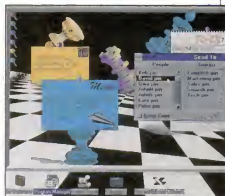
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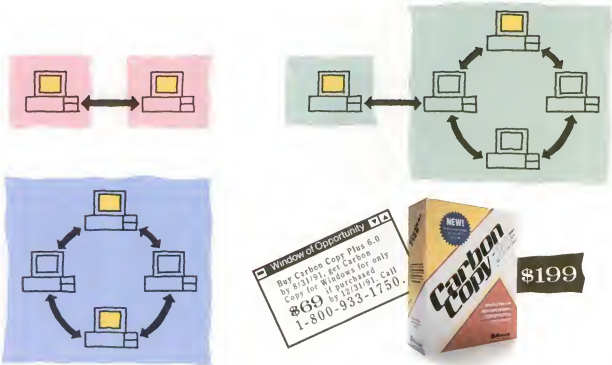
- REVIEWS—Norton Utilities 6.0; PC Tools Deluxe 7.0; Infini-D software.
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Pinboard is an electronic bulletin board that lets users tack notes onto it. See page 38.

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ALLIES / from page 1

Apple/IBM Alliance is an effort to control future directions

be determined by all comers," said Dick Shaffer, editor of *Technologic Letter*, in New York.

Apple, which is looking to Big Blue to help it be a serious player in the corporate market, has experienced a change of heart as well — the old religion is dead.



"Apple needs access to IBM's customer base and a credible server strategy to make [the Mac] succeed," said Shaffer.

While IBM offers its size and clout, Apple has plenty to offer IBM in operating system technology and reputation as a provider of technology that is exciting and easy to use, said

Esther Dyson, editor of *Release 1.0*, in New York.

Individual needs aside, the deal has left no room for Microsoft's participation, industry observers noted.

"This is a slap in the face for Bill Gates. In the long term, they are trying to establish a new platform and it is not clear how [Gates] fits in," said one developer.

That this budding relationship is the

result of the breakup between IBM and Microsoft was not lost on industry observers. "Donald dumped Ivana for Maria Maples, so IBM's gone for Apple in place of Microsoft. You only hope that they [IBM and Apple] put together a better prenuptial agreement," Dyson said.

Still, Microsoft and other competitors will not feel any heat for a while, because any progeny of the IBM-Apple union won't see daylight for at least two years. Meanwhile, Microsoft will continue to sell Windows into the desktop market, which is dominated by Intel-based systems.

"I can't believe that IBM and Apple are going to take over the market and tromp Microsoft and Intel into the mud [right away], because Microsoft is clearly established with Windows," said Will Fastie, editor of the *Fastie Report*, in Baltimore. In the long run, the alliance could hurt Microsoft's efforts in the workstation market. The company is a critical part of the Advanced Computing Environment (ACE) initiative. How the two efforts match up is hard to tell, as Microsoft's New Technology (NT) kernel and Pink exist only in a laboratory, Shaffer said. Shaffer and others give the edge to Apple and IBM because they — along with Motorola — are three companies collaborating, whereas ACE must overcome the difficulties inherent in getting 21 vendors to agree on anything.

More immediately, Microsoft may face stiff competition in the multimedia arena as a result of this alliance, said Michael Gould, an analyst with Open Systems, in Boston.

Apple, armed with QuickTime and a load of multimedia credibility, is a formidable foe technologically to Microsoft's Multimedia PC, said Tony Bove, editor of the *Bove and Rhodes Inside Report*, in Gualaia, California.

In fact, with IBM's installed base and Apple's willingness to make QuickTime a standard, Microsoft could be in for a tough fight.

One certain effect of the alliance is the confusion that will abound in the marketplace and serve to depress sales, said Bob Holmes, manager of systems evaluation for Southern California Gas Co., in Los Angeles. Holmes also questioned IBM's commitment to its current agendas, given this new deal. □

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If there ever was a CAD program out to prove that AutoCAD, CADKEY, VersaCAD, and other \$3000 programs are overpriced, it's DesignCAD!

(MicroCAD News review)

PRICE CUTS / from page 3

PC market analysis

said they expect PC prices to drop even further over the next 12 months by an average of 13 percent. Among these respondents one out of 10 is delaying purchases in anticipation of further price declines. Those delays are lasting an average of two and a half months.

According to some reports, IBM is seeing the greatest surge in sales of its PCs as a result of its spring price reductions.

"What we're seeing there is the impact of [IBM] lowering prices, but not cutting dealer margins," said John W. Stahel, president of Dallas-based Storebrand. "The dealers had the opportunity to make a little more money."

The perception of an economic recovery varies greatly according to industry, and as a result so does the rate of PC purchasing. Stahel said. While stopping far short of claiming an end to the recession-driven buying slump, Stahel described the PC consumer's mood as "cautiously optimistic." □

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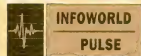
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The Usual Limits Don't Apply.



IBM and
Apple Unite
to Conquer

Players	Current Status
Microsoft	↓ The longtime partner of IBM got the Big Squeeze. All of the deal appears to be structured to keep Microsoft out of the loop. Plus, Gates' goal of having a Windows-based operating system on every desk will face some competition from Pink.
ACE Consortium	→ Too early to say what the IBM/Apple alliance will do to this collection of traditional IBM-compatible makers.
Patriot Partners	↓ With Pink as the basis for IBM's object-oriented operating system, what need does it have for this project?
Compaq	↓ Early attempts to become a leader, not just a follower, may be blocked if current supporters end up backing an IBM/Apple platform.
Users	↑ Long-standing foes IBM and Apple have bent to the pressure of standards. If they actually deliver what they are describing, users should win.
Motorola	↑ This deal puts the chip maker back into the thick of industry changes.

JOINT VENTURE / from page 1

Apple, IBM to codevelop OS

AIX Unix derivative developed jointly by Apple and IBM. The new AIX will be sold by both companies for use with Power Chip-based systems and would include the capability of running Mac applications under AIX.

That portion of the agreement calls for IBM and Apple to integrate the Macintosh into an IBM enterprise network environment, making the Macintosh a more viable corporate purchase, an Apple spokeswoman said.

The agreement could also strengthen IBM's commercial RISC strategy.

"We are very positive on this

deal," said Bill Bluestein, an analyst with Forrester Research Inc. "Unix has not gone very far on the commercial side because it isn't easy to use. The Mac is very easy to use."

Apple plans to incorporate the Power Chip into the Macintosh product family, under the proviso that IBM's current five-chip implementation is reduced to a single chip.

The fourth "area of general understanding" is a vague agreement to create common multimedia platforms for the industry. That technology, too, would be licensed to third parties.

Split reactions at Microsoft: joy, angst

BY ED SCANNELL
AND STUART J. JOHNSTON

Split reactions within Microsoft Corp. reacted with joy and angst last week to the news that IBM and Apple have joined forces, a top Microsoft executive said.

"There are two camps [here]:

People dancing in the streets, celebrating, saying it is the best thing that ever happened to us; the other camp is really paranoid, saying IBM and Apple have formed this systems software company to compete with us," said Steve Ballmer, Microsoft's senior vice president of systems software.

The second part of Ballmer's remark reveals a rare glimpse of concern within Microsoft over the IBM-Apple alliance and amounts to an admission that Microsoft's 10-year rela-

tionship with Big Blue is basically over, observers said.

For the most part, however, Ballmer was critical of the alliance, saying it was clear to him that IBM now intends to abandon OS/2, a product that IBM has nevertheless been promoting hard on its own, recently.

"If IBM has pulled the plug on OS/2, that says to developers, 'Go with Windows,' which is making the dance-in-the-streets camp so happy, Ballmer said.

"I don't get what [IBM] is up to [with the Apple agreement]."

Ballmer added, "They are either abandoning OS/2 for this thing or they have this confusing strategy with Pink [Patriot Partners], and Novell. And, if that's true, what are you supposed to think if you are a customer?"

Users and analysts last week

couldn't resist comparing the alliance to a budding romance, one that is sending Microsoft and IBM to divorce court.

"I think this means the divorce will soon be finalized," said Michael Gould, an analyst with Open Systems Advisors Inc., in Boston. "But the question is, is this a rich rhetoric romance for IBM?"

Some corporate mirror managers agreed with Ballmer that the alliance will spur confusion over what will happen to existing and future versions of OS/2. Microsoft and IBM had been jointly promoting the product up until September.

"In the short term I think it will have a negative impact on IBM because it makes me question what their real commitment is to their current agenda with OS/2," said Bob Holmes, a systems manager for Southern California Gas Co.

IBM officials were not available for comment at press time.

Deal shifts focus away from Patriot Partners

BY ED SCANNELL
AND LAURIE FLYNN

IBM and Apple's proposal to form a new company that develops object-oriented software technology cast a long shadow over the role Patriot Partners will play in IBM's long-term plans.

Patriot Partners, a widely promoted joint venture between IBM and Metaphor Computer Systems Inc., is supposed to deliver an object-oriented software environment that eliminates barriers between system software and applications. At

least some of that agenda overlaps with that of the new IBM-Apple venture.

Officials from Patriot Partners cast things in a positive light, saying Patriot Partners' Constellation Project dovetails well with Apple's object-oriented PC environment.

"This is a consolidation effort," said Bob Metcalfe, a Metaphor board member and consultant to Patriot Partners. "We have been knocking down the door at Apple to get this to happen. The people at Patriot Partners are happy."

David Liddell, Metaphor's

CEO, has been working with Apple and IBM to determine the structure of the new company and Patriot Partners' fate as a separate entity, according to Metcalfe. Liddell is being considered to head the new systems software company, Metcalfe added.

However, sources close to last week's IBM-Apple talks said that momentum within IBM has shifted the last couple of months toward Apple's Pink environment and away from the Constellation Project.

Liddell was not available for comment last week.

Developers enthused and wary

BY TOM QUINLAN
AND DAVID COURSEY

When Apple and IBM agreed to swap operating systems and microprocessor technology, developers reacted in wildly different ways.

Mac software developers were enthusiastic when they considered access to IBM's customers.

"This is great news," said David Winer, president of Userland, in Palo Alto, California. "Now IBM will finally pay attention to Macintosh developers. This will really broaden the market for us."

In fact, Winer is ready to write the next agreement between the two companies himself. "Now what we have to do is get the Mac OS on all of IBM's

platforms," he said.

Even more hardware developers were excited by the alliance and the possibility that a non-Microsoft open operating system might emerge.

Joe Kua, president of Arche Technologies, indicated a willingness to sign up for the IBM-Apple platform, which he expected to do within a year. "I just have more confidence in Apple and IBM's ability to create a RISC-based platform than I do in ACE," he said.

Most manufacturers, looking at the alliance of the two single largest PC manufacturers, had a different view.

"It sounds like they are trying to reinvent the wheel — bent their way," said Art Lazere, chairman of Northgate Computer Systems Inc., in Eden

Prairie, Minnesota. "It may turn out to be oval."

Compaq, one of the founding members of the ACE Initiative, was also wary about two hardware vendors developing chip or operating system standards.

"How open can the products be if they are controlled by your biggest competitors?" said Fred Cutler, director of software marketing for Compaq. "We'd be worried about them controlling our technology."

Don Casey, vice president of Lotus Development Corp.'s spreadsheet division, might have described the possible benefits best.

"If they can succeed in bringing the level of usability we are used to with the Mac to a much larger set of users, then users win and Lotus wins," Casey said.

Industry reaction

"Now what we have to do is get the Mac OS on all of IBM's platforms."

David Winer

"It sounds like they are trying to reinvent the wheel — bent their way."

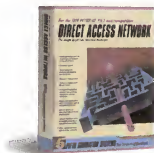
Art Lazere

"We'd be worried about them controlling [Compaq's] technology."

Fred Cutler



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THE SCORES



InfoWorld Product Comparison June 17, 1991

CorelDRAW wins InfoWorld Evaluation

Yes, CorelDRAW has done it again! In a pivotal InfoWorld product comparison, CorelDRAW, running under Windows 3.0, beat all leading illustration packages — Macs included!

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*Mike Heck, Doug and Denise Green,
InfoWorld, June 17, 1991.



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Adobe Systems Inc. has ported several of its products to the Next computer platform, including Illustrator 3.0, TouchType, and several Type Set packages. The \$695 Illustrator 3.0 package lets users see colors and on-screen placement exactly as they will appear when printed. TouchType retails for \$249. Adobe Type Set packages range from \$99 to \$198. (415) 961-4400.

Micro Data Base Systems Inc.'s \$495 Object/1 Professional Pack for IBM Database Manager allows developers to manage an OS/2 Extended Edition Database Manager session within an Object/1 application. (800) 344-5832.

UPGRADES

WordPerfect adds RTF to Mac version

WordPerfect Corp.'s \$495 WordPerfect for Macintosh, Version 2.0.2 includes an RTF export feature that allows users to export files to Microsoft Word, FullWrite, and PageMaker. Users with Version 2.0 or later can receive the upgrade for \$20.50. WordPerfect also announced that schools, teachers, and college students can purchase WordPerfect for DOS and Macintosh for \$135 as a part of its WPCorp's School Software Program 1991. (801) 225-5000.

CE Software's updated QuickKeys supports System 7.0's AppleEvents and also offers enhancements for System 6.0 users. It will retail for \$149, with 10- and 20-user packs priced at \$1,199 and \$4,499, respectively. Users purchasing QuickKeys 2 after April 1 can upgrade for free; before April 1, \$15; and to upgrade from Version 1.X will cost \$49.95. (515) 224-1995.

ANNOUNCED
Solution Systems adds C++ browser

Briefor C++ customizes Solution Systems' editor Brief to include a complete browser for C++. This allows developers to view entire classes or functions and files from within Brief. Programmers can browse multiple files according to class hierarchy, member variables or functions. Briefor C++ costs \$129. (800) 677-0001.

Continued on Page 20

Lucas distributes Artemis package

Schedule Publisher introduced

BY TUSEDA A. GRAGOS

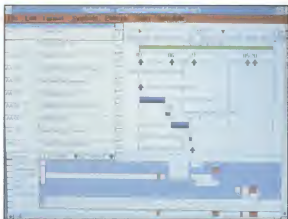
Lucas Management Systems Inc. is throwing its marketing weight behind a new graphical project management package from Advanced Management Solutions (AMS).

Lucas recently announced that it has acquired the rights to distribute the Artemis Schedule Publisher, which began shipping last week. Lucas and AMS have created interfaces to enable data transfer between Schedule Publisher and other products in Lucas' Artemis project management software family, including versions for PCs, networks, Unix, VAX, and IBM mainframes.

Schedule Publisher, which is available for Macintosh, Windows, and GEM, combines rapid processing and a "publishing" approach to report generation, according to Lucas. Users can share files between each of the three versions.

The product offers multiple views into a project database, including bar charts, spreadsheet tables, logic diagrams, and resource conflict analysis. Providing real-time processing capabilities, Schedule Publisher lets users slide a date across the screen with a mouse to see the effect of schedule adjustments, data changes, slippages, and progress.

Although Schedule Publisher



Schedule Publisher sports an identical interface under Windows, Mac, and GEM; users can share files between each environment.

has a number of standard reports that are supplied with the program, users can create additional reports and graphics with several drawing packages.

Schedule Publisher can interpret the graphical report layout and then "publish" its schedule,

resource, and cost information on the graphical report format.

Schedule Publisher costs \$2,000.

Lucas Management Systems Inc., 12701 Fair Lakes Circle, Suite 350, Fairfax, VA 22033; (703) 222-1111.

Ashton-Tate pushes dBase Server Edition

Ashton-Tate Corp. is aggressively positioning its newly released dBase IV 1.1 Server Edition, after taking more than three years to deliver the product.

According to Ashton-Tate, features found in Server Edition, but not in Paradox 3.5 SQL Link or DataEase SQL — include a menu-driven SQL Server database administration program, DPMI support (the capability to operate in Windows enhanced mode), single-command transaction processing, conversion of SQL dialect from IBM SAA to SQL Server, automatic deadlock prevention, and virtual memory management. Borland and DataEase representatives dispute these claims, particularly regarding virtual memory management.

The pricing of the product may spark controversy. Server Edition's DOS Extended support will appeal to individuals who may not even have a database server, but the minimum configuration of Server Edition is a pricey \$1,295 for a three-user license. Current users of any dBase standard version product can upgrade to Server Edition for \$395, and dBase IV Developer's Edition users can upgrade for \$195.

Ashton-Tate Corp., 20101 Hamilton Ave., Torrance, CA 90509-9972; (213) 329-8000.

— Scott Mace

PROGRAMMING

Neural networks are making inroads
Technology has found many practical applications

BY STUART J. JOHNSON

Mention neural networks to most information center managers and their eyes glaze over, confirming that you have entered forbidden territory, alien even to most propper heads.

But this arcane technology — which simulates the electrochemical processes of the human brain by using software, dedicated hardware, or both — is slowly worming its way into the corporate computing consciousness.

In fact, about 1,500 specialists from industry and academia will gather in Seattle this week for the International Joint Con-

ference on Neural Networks (IJCNN) to examine products from more than 50 vendors.

"Eighty percent of Fortune 500 companies [now] have an investment in neural networks," said Derek Stubbs, publisher of *Sixth Generation Systems*, an industry newsletter on the subject. Neural networks emulate layers of neurons in the brain. More expensive products typically simulate more layers and more neurons per layer than less expensive tools.

Neural networks are fed large amounts of data to process and draw conclusions from, with the user or developer specifying the inputs and defining what outputs to solve for. As the network "trains" itself on the input data, neurons in one layer fire, which in turn triggers some of the

neurons the way, and thus simulates the path the brain takes. This "back propagation" technique, while not the only neural net training method, is the most popular.

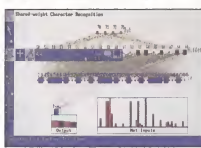
Users have found many practical applications for neural nets, particularly in recognizing patterns buried amid huge quantities of statistical data, such as in scientific experiments, loan processing, and stock markets.

NeuralWorks Professional II/Plus, from Pittsburgh-based NeuralWare Inc., is one of the current high-end favorites, according to Stubbs. The package, which includes multiple network types and the capability to provide an explanation of how a conclusion was reached, ranges in cost from \$1,895 for a PC/AT version to \$5,995 for an RS/6000 version.

"We use it for simulations in downstream process control and also to do some post processing on seismic data," said Jeff Lin, senior systems analyst at Texaco, in Houston. "We apply it to both oil exploration and refining."

At \$79, DynaMind, from NeuroDynamX of Boulder, Colorado, is a less expensive neural net developer's tool. The package includes a C language object module that "lets you link a trained library into your

See NEURAL, Page 16



NeuralWorks Professional II/Plus was used to create this neural network for handwritten digit recognition.

Transforming
an industry
than just

takes more another pretty interface.

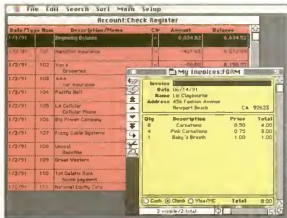
It takes more than good looks to make the most of personal computing. While OS/2® features the kind of user-friendly, graphical environment that's a big part of where the personal computing industry is heading, there's much more to OS/2 than meets the eye.

To meet today's needs, OS/2 was created to advance your computing capabilities, not just give them a facelift. OS/2 already offers many advantages like true multitasking instead of slower, less dependable task-switching. And OS/2 was designed with networking in mind, giving you easy access to integrated communications, database and LAN solutions. Today's OS/2 also features "crash" protection—if one application fails, your others remain intact, so there's no need to reboot, reconnect or reconfigure. And OS/2 will be delivering even more advancements in the coming months.

The new, easier-to-install OS/2 2.0 is being designed to run OS/2 applications better than earlier versions, DOS applications better than DOS, and Windows® applications better than Windows. And you'll be able to run them all simultaneously, with better performance,* more available memory and access to the entire spectrum of applications created for DOS, Windows and OS/2. Act now and you can buy OS/2 1.3 SE for just \$99, if you own IBM DOS. If not, you can buy OS/2 1.3 SE at the new, low price of \$150. In either case, you'll get an upgrade to OS/2 2.0 upon release, at no extra charge.** And that'll put a smile on just about any face. For more information, contact your IBM Authorized Remarketer or IBM marketing representative.

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*As compared to earlier versions of OS/2. **Upgrade offer expires 12/31/91. IBM and OS/2 are registered trademarks of International Business Machines Corporation. Windows is a trademark of Microsoft Corporation. ©1991 IBM Corp.



Panorama II offers improved forms handling features, including the capability to create forms that display multiple records.

MACINTOSH

Panorama has full-fledged programming language

BY ELIZABETH EVA

The venerable Panorama flat-file database for the Macintosh is getting a new look for the 1990s.

In addition to providing System 7.0 compatibility, ProVue Development has outfitted Panorama II with a streamlined interface, improved report and label generation capabilities, a full-fledged programming language, and multiser user support, the company said.

ProVue has replaced Panorama 1.5's spreadsheetlike data entry form with a pop-up Input box. It has also organized its multiple file submenus into a new View menu, from which users can open forms, macros, and cross-tabs.

Users can add, remove, and change field properties without using the design sheet, according to Jim Rea, ProVue's president.

In addition, a QuickReport dialog box allows users to auto-

matically create a standard row-and-column report, to which users can add graphics. A Quick-Label button makes it easier to set up and copy fields onto labels, according to the company.

Panorama's printing capabilities have also been enhanced.

The new programming language, PanTalk, supports existing macros and lets users create custom menus or modify existing menus.

The Panorama II database will run on any AppleTalk Filing Protocol-compliant network. Users can access files on a shared volume, if the files are stipulated as multiser.

Panorama II, which began shipping this month, retails for \$395. Registered users of previous versions can upgrade for \$99.95.

ProVue Development, 15180 Transistor Lane, Huntington Beach, CA 92649; (714) 892-8199.

NEURAL / from page 13

Technology finds practical applications

own programs," said Vance Howard, NeuroDynamX vice president of marketing.

Other inexpensive tools include Brainmaker from California Scientific Software of Grass Valley, California, which comes in both \$495 professional and \$195 standard editions, and \$195 NeuroShell from Ward Systems Group of Frederick, Maryland, Stubbs said.

One innovative tool for end-users is Braincel, an add-in for Microsoft Excel 3.0 for Windows from Promised Land Technologies, in New Haven, Connecticut. The \$249 tool adds a few simple commands to the Excel spreadsheet.

An update scheduled to ship this month, Braincel 1.1, will

support up to 552 columns, said Stanley Dalkneff, president of Promised Land.

A trial project at S.C. Johnson Wax, in Racine, Wisconsin, used Braincel and Excel to dramatically cut the time required to correlate experimental and observed data, said senior research associate Dr. Lao-su Su. Using accepted statistical methods, it might take as long as six months to perform the correlations, but "we reached 90 percent accuracy in 2 minutes," Su said. However, neural nets are not appropriate for every problem.

"In some [instances] the problem is too complex, and in others, you can't get historical data," said Texaco's Lin. □

PROGRAMMING

AM/V3 exploits OS/2's power

Applications Manager features true multitasking

BY SCOTT MACE

Whereas most application development tools are focused on supporting the Windows applications programming interface, an existing OS/2 tool now exploits the power of OS/2 Presentation Manager more fully.

Applications Manager, Version 3 (AM/V3) allows developers to create true multitasking applications, according to officials at Intelligent Environments. Multiple threads can have their own secondary windows or run in the background for communication or database service operations.

AM/V3 also offers tools for seamless data sharing and syn-

chronization between threads. In addition, AM/V3 allows developers to utilize OS/2's support of re-entrant code within AM/V3 applications.

Also provided with AM/V3 are dynamic linked modules (DLLs), which mirror OS/2's dynamic link library capability. When DLLs are modified, changes are reflected across applications dynamically, without the need to recompile or relink entire systems.

Also added is a graphical trace and debug tool. The debugger, which speeds program testing, functions as a graphical version of Codeview, and includes skip and stop, navigation, data view and modi-

fication, and a number of breakpoint features.

Major graphical user interface enhancements to AM/V3 include cascading pull-down menus, multicolumn list boxes, bit maps, and integrated business graphics. Other functions allowing heads-down, high-speed data entry include field edits and masks, as well as validation and dynamic field control over screen objects.

A full development copy of AM/V3 costs \$7,400. It requires OS/2 1.2 or 1.3, and it is capable of running on OS/2 2.0, according to Intelligent Environments.

Intelligent Environments, 2 Highwood Drive, Tewksbury, MA 01876; (508) 640-1080.

PROGRAMMING

Tool gives high-level SQL Server access

BY ELIZABETH EVA

A newly announced scripting language from ProtoView Development Co. works with ProtoView's Windows 3.0 computer-aided software engineering (CASE) tools to help users create data access applications.

SQL View, currently in beta testing, works with ProtoView's Screen Management Facility and ProtoGen Application Generator to simplify the design of a Windows application interface. According to Dean Guida, company president, even users with minimal programming experience can quickly produce professional applications with the scripting language.

SQL View will provide such database access capabilities as table browsing, spreadsheetlike

data lens extraction, and interactive querying and update functionality. It will also include features for data formatting and validation.

Initially, the product will provide high-level access to Microsoft SQL Server database tables, views, and stored procedures. Support for Gupta's and Oracle's SQL server products will be integrated in later releases, according to Guida.

ProtoView is also working on a run-time version of SQL View; currently, developers must use the ProtoView products in conjunction with a third-party compiler such as the C++ compilers from Borland and Zortech, as well as the Microsoft Software Development Kit, if the compiler requires it.

In addition, ProtoView will

ship a delayed update to its Screen Management Facility July 14, the company said. Version 3.2, which adds enhanced screen painting capabilities and code generation for Borland C++ and Zortech C++, was originally scheduled to ship in May. The update also includes the capability to place bit maps and icons within push-buttons, and multiple range checking for data entry fields.

A price has not yet been set for SQL View, though Guida said the package would retail for under \$500 when it ships in the third quarter. The Screen Management Facility and ProtoGen Application Generator together retail for \$895.

ProtoView Development Co., 353 Georges Road, Dayton, NJ 08810; (908) 329-8588.

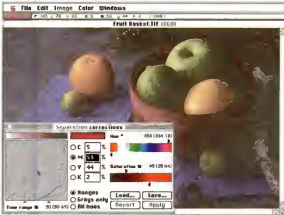
PRODUCT SPOTLIGHT

PrePrint 1.5 for Mac can separate PostScript files

Version 1.5 of Aldus Corp.'s PrePrint Macintosh software for producing color separations incorporates 40 enhancements introduced since Version 1.0. Chief among them is the capability to separate any PostScript file that conforms to Adobe System's color separation and document structuring conventions.

PrePrint 1.5 also works with Aldus PageMaker 4.01 and FreeHand 3.0. It also includes the capability to recognize and print the Desktop Color Separation format, and to print separations page by page, rather than color by color.

The update costs \$495; users of Version 1.0 can upgrade for \$30. (206) 628-2361.





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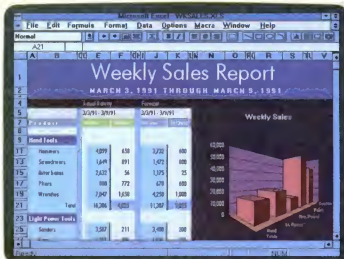
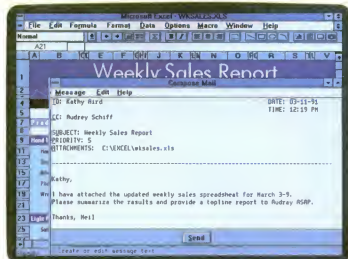
NANAO USA CORP.

23510 Telo Ave., Suite 5
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high refresh rate
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VGA, 8514/A and Mac II Compatible

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LAKE & SONS

HARDWARE DISTRIBUTORS

Weekly Sales Report March 3 through March 9

Topline Summary

It was a terrific week. *Fix-It-Yourself-Week* has depleted our stock. We are well ahead of our most optimistic forecasts.

Tools

And this many hand tools in bundling.

Tools

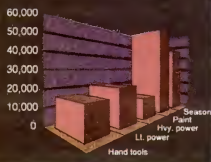
Like a big hit. Sales. Small bundling.

Working as a hobb... and jigsaws have... However, as woodworking is primarily a winter activity, we are projecting a slow-down in demand for the summer season.

Paint

Sales in both indoor and outdoor paint and supplies continue their upward growth in anticipation of

Weekly Sales



Now anyone can afford an office with a view like this.



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You'll also find PowerPoint® for Windows, a graphics presentation program that helps you create great looking business presentations. And Microsoft Mail, an electronic mail system that makes sharing information throughout the company a breeze.

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Microsoft
Making it all make sense®

PIPELINE from page 13

TRAINING

Classes planned for Persuasion update

Logical Operations Inc.'s one-day training courses for Aldus Corp.'s soon-to-be-released Persuasion 2.0 for Windows will cover skills necessary to produce both simple and complex presentations. The instructor's Reference book addresses classroom setup, along with hardware and software considerations. The minimum order is 12 student manuals; each manual costs \$24. (800) 456-4677.

UPGRADES

Shana's 'Informed' supports System 7

Shana Corp.'s Informed line of forms processing products now support System 7.0's AppleEvents, Publish and Subscribe, balloon help, and TrueType fonts. Informed Designer lists for \$295; Informed Manager is \$195; Informed AutoForm is \$149. (403) 463-3330.

OurSoft's Turbo Brief, Version 2.0 creates an integrated software engineering environment for the Brief program editor. Turbo Brief requires 1.5M or less RAM, and costs \$249.50 plus \$10 for shipping and handling. (206) 643-0204.

The enhanced version of Adobe Systems Inc.'s Photoshop for the Macintosh is now shipping. Version 2.0 retails for \$895; registered users can upgrade for \$149 until August 31; after that upgrades will be \$199. (415) 961-4400.

ALLIANCES

HP ports CAD to Sun Sparc systems

Hewlett-Packard Co. has signed an agreement with Sun Microsystems to port its mechanical CAD software to Sun Sparc stations. The initial port of MCAD will include HP ME10 two-dimensional design and drafting software, IGES translator, and the HP Data Management System. Initial products are expected in the first quarter of 1992.

WordStar International's Writing Tools Group will publish Houghton Mifflin's American Heritage Electronic Dictionary as a stand-alone product. The \$99 package operates as a desk accessory on the Mac and a TSR on the PC. Mac and DOS versions are available now. (415) 382-8000.

Frame Technology Corp. has inked an agreement with Mentor Graphics in which Mentor will sell and support Frame-

Maker. Frame's document publishing software, Mentor will also integrate FrameMaker into its Falcon Framework for Concurrent Design and sell it with all of its design applications for workstations; shipments are expected in early 1992. (408) 433-3311.

BUNDLES

T/Maker, Reference extends contract

T/Maker Co. and Reference Software International have extended their current bundling contract of WriteNow 2.2 and Grammatik Mac 2.0 through September 30, introduced in September 1990, the System 7.0-compatible WriteNow/Grammatik combination has a suggested retail price of \$199. (415) 541-0222.

Paracomp Inc. will include its QuickPics animation and sound compression/playback system in all future shipments of Swivel 3D Professional and ModelShop II. QuickPics compresses and plays back animations in 256 colors on any Mac II, SE, or LC. The stand-alone product is priced at \$149; registered users of any Paracomp product can purchase QuickPics for \$79. (415) 956-4091.

ANNOUNCED

MacTen unifies Unix, Mac OS

MacTen brings the power of Unix to Macintosh hardware by extending the existing Macintosh software, rather than replacing it. The software, produced by Tenon Instruments, allows users to run off-the-shelf Macintosh programs while simultaneously running Unix programs, without requiring that users partition their disks or add new device drivers. A workstation license for the kernel system software is priced at \$995; a server license costs \$835. A workstation license for the development system software costs \$990, and the server license retails for \$1,230. (805) 963-6983.

Easy file exchange between your Macintosh and DOS-based computer is now possible with Pacific Micro's Mac-in-DOS, the PC version of the data transfer software program, Common-Link. Files are simply copied and conversion takes place automatically. Mac-in-DOS is priced at \$189. (415) 948-6200.

More than 1,700 detailed, HyperCard-searchable descriptions of Macintosh software titles are available on CD-ROM from ICP. The ICP Macintosh Software Product Database will be completely updated and reissued every three months. It retails for \$29.95. (317) 844-7461.

PROGRAMMING

'Both' writes Mac front ends

OOP system speeds Mac-to-mainframe development

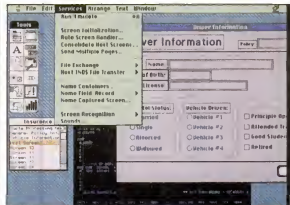
BY SCOTT MACE

Developers can write Macintosh front ends to existing mainframe applications using Connective Corp.'s Both.

Based on object-oriented technology from its predecessor, Masquerade, Both represents a true client/server application development system, according to Fred Schaffler, senior vice president and chief operating officer at Connective Corp.

Host applications written for IBM's CICS, TSO, and CMS environments need not be rewritten to become back ends to front ends written with Both. Mac users can build fully operational host applications in days or weeks instead of months, Connective officials said.

Unlike Masquerade, Both includes Smartcode, a set of arithmetic, logical, and file handling functions enabling true client/server applications. Smartcode can also sort and find data, manipulate strings, execute specialized 3270 functions, and transfer data and control to other Mac applications.



Both's Smartcode provides arithmetic, logical, and file-handling capabilities, and it can also execute specialized 3270 functions.

Both lets developers consolidate multiple host screens into one scrollable window, create customized business graphics with no programming, and automatically consolidate fields. The program runs on Mac Plus or higher systems.

Both will ship this month. The development system, which

includes two days of on-site support and six months of phone support, sells for \$4,795. Runtime systems sell for \$1,500 for five users and \$2,500 for 10 users.

Connective Corp., Talleyrand II, 220 White Plains Road, West Nyack, NY 10991; (914) 631-5365.

JetForm E-Mail eases forms passage

BY LESLIE S. FELDMAN

JetForm Corp. is reading an electronic mail front end that lets users send and receive complex forms across a network.

The initial release, due out in August, will interface JetForm-designed forms with the Windows version of Da Vinci EMail. Future versions will support other packages, including Lotus cc:Mail and Microsoft Mail for PC networks, said Tom Plante, JetForm's vice president of sales and marketing.

Rival forms vendor Delrina

Technology Inc. is also preparing a forms-based E-mail front end. See "Delrina promises to ease network form processing," June 24, page 6.

JetForm E-Mail is based on software code developed by Microsoft Corp., according to the company. "About 800 Microsoft employees are using JetForm E-Mail," said Barry Gillespie, JetForm's director of marketing.

All required forms for JetForm E-Mail can be designed using the current JetForm design module.

JetForm E-Mail offers users three transmission options: If a user knows the intended recipient already has a particular form, "data only" suffices; "data and form" will send both the form and data; "data and form as text message" lets any recipient read the information, even if he doesn't have the front end installed.

A five-user version will list for \$795; a 20-user version costs \$2,395.

JetForm Corp., P.O. Box 606, Leominster, MA 01453; (613) 594-8886.

SafeLink adds antivirus protection to file transfer

BY TUESDA A. GRAGGS

Users concerned about transferring viruses along with their files can turn to a new product from Fora Inc. for protection.

SafeLink combines a file transfer application with antivirus software that checks for over 300 known viruses. If it detects a virus, SafeLink alerts the user, who can then stop or continue with the transfer after deleting the contaminated files.

SafeLink need only be loaded onto the sending computer; it is

then automatically loaded onto the receiving computer via serial cable. It includes serial and parallel cables for file transfer.

Fora Inc. is also shipping a separate antivirus package, SafeGuard, which works on standalone PCs and over networks. SafeGuard's protection scheme incorporates scanning, monitoring disk access, and running the utility Checksum. The software uses "intelligent virus traps" to identify previously unknown viruses.

SafeGuard also protects the host sector from virus damage

with its Sentry Drive hardware, which connects directly to a system's parallel port, according to the company. If the system's hard disk crashes as a result of a virus, SafeGuard downloads the isolated virus-free data and provides damage recovery.

Currently available, SafeLink costs \$69.95, and SafeGuard is priced at \$79.95. Through August 31, SafeLink and SafeGuard are available for \$39.95 and \$49.95, respectively.

Fora Inc., 3081 N. First St., San Jose, CA 95134; (408) 944-0393.



WINDOW MANAGER/ Brian Livingston

Avoid trouble by running DOS commands from batch files

der Windows. Take the Append command, which makes data in a particular subdirectory appear to be in the current directory (for applications that can't change directories). If such a command is in effect, Windows may think that a file it found on your disk is actually located in the current directory, and may display an error message or write inaccurate information to that file later.

Another command that can be useful for older DOS applications, but confusing to Windows, is SUBST. This command makes a particular subdirectory, such as C:\DATA, appear to be the root directory of a fictitious drive, such as E:. Many microcomputer managers use this command to create short "aliases" for long directory names, allowing them to place more directories in the Path than would be permitted by the Path's 127-character limit.

If you use SUBST while Windows is running, however, some Windows applications may act improperly. The Windows Setup program, which installs Windows, is especially sensitive to fake drives. If a SUBST command is in effect, Setup thuds ungracefully to a halt during the process of scanning all your hard drives for applications.

In any case, you should prevent such destructive commands as CHKDSK /F — discussed last week — from being run under Windows. This includes any command that rewrites your file structure directly, such as disk optimizers, interleave utilities, and undelete programs. (Some disk utilities detect when they are being run in a DOS session under Windows, and refuse to perform these activities until the user has exited Windows.)

To keep these commands from mistakenly being started inside Windows, you should run them from batch files that test for Windows. To protect yourself from accidentally running CHKDSK /F under Windows, for example, change to your DOS directory and rename CHKDSK by typing the command REN CHKDSK.COM CHKDSK1.COM. Then create the following CHKDSK.BAT batch file in a directory on your Path:

```
echo off
if "%1"=="*" goto :OK
iswin
if not errorlevel 1 goto :OK
echo.
echo You can't use CHKDSK options
      in Windows.
echo.
goto :END
:OK
chkdsk %1 %2 %3
:END
```

This batch file executes the renamed CHKDSK.COM command as usual if you typed CHKDSK with no switches, or if Windows is not running. To test for Windows, CHKDSK.BAT uses the

ISWIN.COM program printed in last week's column.

If you started this batch file by typing CHKDSK /F, and Windows is running, you receive a message that you can't use parameters to run CHKDSK under Windows, and CHKDSK.BAT quits. ISWIN.COM sets the DOS Errorlevel variable. After you use ISWIN.COM, the Errorlevel will be

zero if Windows is not running, and a positive value if Windows is running. The following chart shows these values:

Windows is not running	0
Windows/386 2.X is running	1
Windows 3.X is in 386 mode	3
Windows 4.X is in 386 mode	4

Windows/386 2.X is running	127
Windows 3.X is in real mode	128
Windows 3.X is in standard mode	255

CHKDSK.BAT exits if the Errorlevel is 1 or higher. You can create a more sophisticated batch file that takes different actions depending on which mode or version of Windows is currently running.

Just When The Competition Thought It Was Catching Up.



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Brian Livingston is president of Windows Consulting and author of Windows 3 Secrets (IDG Books, San Mateo, CA).

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For the name of the nearest dealer, call 1-800-527-3500.



The microLaser PS7 has earned the 1990 PC World Best Buy award; microLaser PS35 has earned the 1990 InfoWorld Excellent Value award and 4½ stars from MacUser, October 1990. *TI suggested retail prices. (Dealer's prices may vary.) microLaser is a trademark of Texas Instruments Incorporated. Adobe, PostScript and the PostScript Logo are registered trademarks of Adobe Systems, Inc. Microsoft is a registered trademark and Windows is a trademark of Microsoft Corporation. ©1991 TI 7886

**TEXAS
INSTRUMENTS**

HARDWARE

PIPELINE

PRICE CUTS

Apple skins cost of CD ROM drive

Apple Computer Inc. has trimmed the cost of the AppleCD SC Plus CD ROM drive by 10 percent to \$799, while boosting the average access time by 25 percent.

Hewlett-Packard Co. has cut \$200 to \$500 off the prices of its DraftPro family of plotters and memory boards. The company has also extended the warranties on its DraftMaster and DraftPro plotters to three years. (800) 752-0900.

Following Intel Corp.'s lead, Specialty Development Corp. has slashed the prices of its math coprocessor products between 50 and 71 percent. Prices for the coprocessors now range from \$119 to \$299. (512) 327-8608.

BUNDLES

NEC assembles PC, Mac CD starter kits

NEC Technologies Inc. has put together a CD starter kit, three reference software applications, and software enabling the drive to play audio CDs. The Macintosh version will list for \$749 through January 15, 1992. PC versions will range from \$849 to \$899. (708) 860-9500.

AST Research and InfoChip Systems will be bundling Super PC-Kwik disk caching software from MultiSoft Corp., which retails for \$79.95, with their products. (503) 644-5644.

A version of LANtastic from Artisoft Inc. will ship with Amity Inc.'s ISA-based 486/25E system with a 120-megabyte hard disk. The preinstalled software lists for \$900. (714) 727-0788.

SHIPPING

Poquet flash cards take on hard drives

Poquet Computer Corp.'s \$495 ThinCard Drives, which use Flash PC memory cards in 1- and 4-megabyte configurations, offer users re-programmable, removable data storage in place of a hard disk drive. A 2-megabyte card will ship this month. The price of the memory cards ranges from \$300 to \$1,400. (408) 496-0575.

Continued on page 29

Monitors lag behind graphics boards

Dot-pitch technology is being refined as graphic image quality suffers

BY NICO KROHN

The increasing popularity of high-resolution graphics boards demands better monitor technology, but a lag between advances in graphics board technology and monitor technology means monitors are often to blame for fuzzy graphics.

Among other things, a moni-

tor's dot pitch — the width of a trio of red, green, and blue dots that make up a pixel — affects the appearance of images on screen. If the dot pitch is too large, characters look blurry and graphics show extraneous lines and dots.

"If you don't have enough

TECH UPDATE



While manufacturers squeeze higher resolutions onto smaller screens, 17- and 21-inch monitors still maintain an edge in clarity.

dot pitch, it'll look like you're looking through a screen door," said Karl Guttag, strategic manager of computer video products for Texas Instruments Inc., in Houston.

But reducing a monitor's dot pitch is technically difficult to do and also adds to the cost of a monitor.

In the commodity-style monitor market, many manufacturers won't incur the extra cost and engineering it takes to reduce dot-pitch size, graphics experts said.

Because high-resolution graphics boards don't require specific dot-pitch sizes, users who purchase them will be disappointed to discover that the dot pitch of the monitor severely reduces image quality.

"A manufacturer could take a .39 [millimeter] dot-pitch monitor and modify the tube so it will display 1,024 by 768 [pixels] — but it won't look great," said Jon Peddie, publisher of PC Graphics Report, in

Oakland, California.

"As the dot pitch gets smaller — down to .26 or .28 — you get a sharper image. You want to have a tube with the smallest dot pitch," Peddie added.

The smallest dot pitch on a monitor currently shipping is .25 millimeters, but most monitors have much higher dot pitches.

The standard is generally between .28 and .31, although an increasing number of manufacturers are introducing monitors with a .26-millimeter dot pitch.

When a dot pitch is too high, whites can appear tinted with other colors, because a white dot on screen is actually made up of red, green, and blue phosphorescent lights. Characters also aren't as sharp, and patterns emerge in the graphics that weren't in the original images.

Each red, green, and blue light in a computer monitor's tube shines through a "shadow

See MONITORS, page 27

Toshiba expands T2000 line of notebook systems

BY TUESDA A. GRAGGS

Toshiba America Systems Inc. has expanded its T2000 line of notebook computers and is now shipping the T2000SX, T2000SXc, and T2000 notebook.

All three computers feature 3½-inch floppy drives and side-lit black-and-white 640-by-480-resolution VGA LCDs.

The notebooks weigh 6.9 pounds with battery. They measure 12 inches by 10 inches by 1.9 inches, and each has a VGA external monitor port and 25-pin parallel printer port.

The SXc computer's 386SX-based chip runs at 20 MHz and features 2 megabytes of RAM, expandable to 10 megabytes. It lists for \$4,199 and for \$4,499 when equipped with either a 40-megabyte or a 60-megabyte hard disk.

Toshiba's SX notebook also runs at 20 MHz and is based on Intel's 80386SX processor. It features 1 megabyte of RAM, expandable to 9 megabytes, and comes with hard disks in capacities of 20, 40, or 60 megabytes. The units have suggested prices of \$3,399, \$3,749, and \$4,049, respectively.

The SX and SXc models are equipped with Toshiba's nickel-hydrogen battery that is designed to offer a 22 percent improvement over nickel-cadmium batteries in capacity, per unit weight. The battery is designed to work with a microprocessor-based power management system that extends battery life up to 5 hours and recharges in 1½ hours.

Toshiba's T2000 computer is based on an 80C286 12-MHz processor and features 1 megabyte of RAM, expandable to 9 megabytes, and a 40-megabyte hard disk. It has a suggested price of \$3,149.

The computers also use AutoResume, an "electronic bookmark" that remembers the user's place in an application when the power is turned off or if the battery is exhausted. They also have a power supply "gas gauge," automatic display and hard drive shutdown, low battery warning light and audible alarm, as well as automatic CPU "sleep" mode to enhance battery life.

Toshiba America Systems Inc., Computer Systems Division, 9740 Irvine Blvd., Irvine, CA 92718; (800) 334-3445.

PRODUCT SPOTLIGHT



Windows 3.0 drivers available

Colorgraphic Communications Corp. has introduced a Windows 3.0 driver for its Dual VGA + and Dual VGA/MC video adapters. The drivers enable Windows 3.0 users to open windows on eight separate monitors. Users can also share data from one application across those eight screens or move data from one screen to another.

Colorgraphics' video adapters were limited to sharing data and opening multiple windows across only two screens when the products were first introduced last year.

The suggested price for the AT- or ISA-bus compatible Dual VGA + is \$795; the Micro Channel version of the board costs \$995. Colorgraphic Communications Corp., 5381 New Peachtree Road, P.O. Box 80448, Atlanta, GA 30366; (404) 455-3921.



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The Computer Inside.™

Wang to build PC based on Intel's 50-MHz 486 chip

BY NICO KROHN

Wang Laboratories Inc. has joined a growing list of computer manufacturers who plan to build machines around Intel's 50-MHz 486 chip.

Wang's EC 460/50C is an EISA computer that will run DOS, Windows, OS/2, and Unix operating systems. It was designed to be a high-end, stand-alone machine, as well as for use as a server.

The EC 460/50C comes with 4 megabytes of RAM, which can be expanded up to 64 megabytes.

The system is designed to use 8-megabyte single in-line memory modules

(SIMMs), but is also capable of supporting 1- and 4-megabyte SIMMs.

The system includes 256K of external two-way write-back cache. Users who elect not to use the Video BIOS cache can take advantage of the computer's video ROM or ROM BIOS shadowing.

A monitor that's bundled with the EC 460/50C supports display resolutions of

as great as 1,024 by 768 pixels in 16 colors, or 800 by 600 pixels in 256 colors. The Super VGA display comes with an 8514/A pass-through connector.

The EC 460/50C also includes six 32-bit EISA slots, all with bus-mastering capabilities, and it comes with several bays for installing hard disk drives. It ships with a single 3½-inch or 5¼-inch floppy

disk drive and IDE hard drive controller.

The \$12,995 system, slated to ship in September, will have several security features, including a mechanical lock that prevents cover removal, password protection, and an unattended keyboard lock-out feature.

Wang Laboratories Inc., 1 Industrial Ave., Lowell, MA 01851; (508) 459-5000.



Despite its status as an IBM reseller, Wang introduced its own 50-MHz 486.

Twinhead develops 'chip-only' line of upgradable PCs

Twinhead Corp. has introduced a line of upgradable computers that requires only the replacement of the chip.

The Superset 600 line includes the 600/33V, a 386 33-MHz computer; the 600/486SX, using Intel Corp.'s 486SX 20-MHz chip; and the 600/433V, a 486DX 33-MHz chip from Intel.

Features common to the three machines include an upgradable platform via a "chip only" implementation, four ISA slots, built-in 1,024-by-768 SVGA, a controller with 512K of SVGA memory upgradable to 1,024K, built-in AT-IDE interface and floppy controller, and socket and internal support for a corresponding coprocessor.

BIOS for the computers is upgradable via the all-in-one video and system BIOS. The desktop machines also include support for as much as 32 megabytes of RAM on the motherboard, two serial ports, and one parallel port.

The 600/33V costs \$2,599; the 600/486SX lists for \$2,999; and the 600/433 machine is \$3,999.

Options include 128K of external cache for the 33V and 486SX machines, 100-, 200-, and 400-megabyte hard drives, and additional floppy drives.

Twinhead Corp., 1537 Centre Pointe Drive, Milpitas, CA 95035; (408) 945-0808.

—Tuseda A. Graggs

Now that it's such
a popular E-mail program,
maybe we should call it Post Office.



When WordPerfect Corporation created WordPerfect Office, we set out to simplify the way people organize their days, schedule their meetings and communicate with their colleagues. In short, to streamline many of the

most common day-to-day tasks in any office environment. And that's exactly what WordPerfect Office can do.

But meanwhile, it's also become the fastest-growing E-mail package for PCs.

And that seems only natural. Because WordPerfect Office lets you quickly and easily send documents,

memos and schedules to the "in-boxes" of everyone on your mailing list—across the hall, across the street, wherever they're connected to WordPerfect Office.

Plus, WordPerfect Office has gateways that allow you to communicate with many other kinds of E-mail systems—MCI, AT&T Easylink and MHS, for instance.

And unlike most E-mail packages, WordPerfect Office organizes your messages in "in-boxes" and "out-boxes" and lets you check their status anytime. If you've sent a message that has not yet been read, for example, you can retrieve it and make changes. You can even delete the message completely, as though it had never been sent.



MACINTOSH

E-Machines expands low-cost line of graphics products

By Tom Quinlan

E-Machines Inc. has expanded its line of low-cost graphics products for the Macintosh, with a monitor, 24-bit graphics card, and an accelerated 8-bit graphics board.

The products are designed primarily for use with Apple's new low-cost systems

—the Classic, LC, and Ilii—which were introduced last October and represent a growing percentage of Apple's sales.

The ColorPage E16 monitor offers resolutions ranging from 640 by 480 pixels to 1,024 by 768 pixels. It is designed for compatibility with the built-in video that Apple offers with the Mac LC, Ilii, and Ilii systems or E-Machines

graphics boards.

The 16-inch monitor can display 256 colors at its lowest resolution when used in conjunction with the built-in video of the Mac LC, Ilii, and Ilii, or with E-Machines' new 8- and 24-bit graphics cards.

The XL8 offers on-board acceleration, hardware panning, a 200 percent zoom

feature, and virtual screens. It is compatible with 13- and 14-inch monitors from Apple. The 8-bit color board can also be upgraded to support 24-bit true color through an E-Machines memory upgrade kit, which gives the board the same capabilities as E-Machines' XL24 24-bit card.

E-Machines' new 24-bit card, the Futura/24, supports the same features as the XL8. In addition, it offers 24-bit photo-realistic color.

The Futura/24 can be upgraded to the equivalent of an XL24 card. The XL24 lets users capture true-color video in real time when used with E-Machines' QuickView Studio.

The monitor has a list price of \$1,595. The XL8 has a suggested price of \$995, while the Futura/24 lists for \$1,495. All products are now shipping.

E-Machines Inc., 9305 S.W. Gemini Drive, Beaverton, OR, 97005; (503) 641-0946.

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E-Machines' ColorPage E16 monitor is aimed at the low-cost Mac market.

MONITORS / from page 23

Technology lags

mask" — a piece of metal full of tiny holes.

The shadow mask visually separates one pixel from the next. The distance from one red phosphorescent light to the next red light (there is one green and one blue light between the reds) is a monitor's dot pitch.

"If you don't have enough dot pitch ... [you get an effect] we call 'beating' between the shadow mask and the image itself," Guttag said.

The effect is intensified at higher resolutions, but it is minimized by larger monitors. Graphics displayed on a 17-inch monitor with a dot pitch of .31 millimeters may look fairly clear, but the same graphic displayed on a 14-inch monitor could appear blurry, Peddie said. A dot pitch of .21 millimeters is ideal for a 14-inch monitor, but it is difficult to squeeze three phosphorescent lights into such a small space, Peddie said. Monitor manufacturers are working toward that ideal, but a spokesman for Samtron said most users can't expect to see .21-millimeter dot pitches until 1993.

In the meantime, graphics board vendors and companies such as IBM that expect 14-inch monitors to become the desktop standard for multimedia find today's dot pitch limits frustrating. □

Notebook system has phone, printer

The Modular Portable Office weighs 16 pounds and includes a fax modem

BY NICO KROHN

Computer Masters has introduced another notebook-based integrated system, which weighs 16 pounds and lets users carry their offices around with them.

A full configuration of the Modular Portable Office comes with a 386SX notebook-size computer, a 4½-pound Canon Bubble Jet printer, a fax modem, an NEC portable phone, a digital camera, and a hand scanner.

Unlike Computer Masters' original product, the \$8,995 Cozmo, the Modular Portable Office costs \$5,695 including a carrying bag.

The higher-priced Cozmo package includes all of the components available in the Modular Portable Office, except the hand scanner, but it also has a

rigid carrying case with a built-in AC power supply. The Cozmo unit's design makes it possible for users to recharge all components simultaneously; all they have to do is plug the carrying case into the wall. Modular Portable Office users must charge each component separately.

Modular users can also buy the components separately — an advantage Cozmo users don't have, said a spokesman for Computer Masters. And although the basic configuration includes a 386SX, users can opt for a less-expensive 286-based notebook or leave out components they don't need.

The 20-MHz 386SX that ships with the full configuration includes a backlit VGA display and a 20-, 40-, or 60-megabyte hard disk drive.

The Bubble Jet printer, a \$365 option, prints on any type of paper. The \$495 fax modem transmits at 9,600 bits per second (bps); it sends and receives modem data at 2,400 bps.

NEC's P200 portable cellular phone comes with a 40-number

speed dial and supports 18 hours of standby operation. It costs \$595. Users can send data using the cellular phone and a \$395 data interface that Computer Masters offers.

A 4-inch, 400-dot-per-inch hand scanner for as little as \$295 lets users input images, and a \$945 digital camera stores up to 32

images that can be uploaded to the computer for editing or fax transmission.

The Modular Portable Office is available now.

Computer Masters, 6505 S. Sepulveda Blvd., Los Angeles, CA 90045; (213) 645-6530.



Like the Cozmo, the Modular Portable Office offers users an integrated portable system.

Aox introduces modular MCA multiprocessing boards

BY ED SCANNELL

Aox Inc. demonstrated a work in progress at last month's PC Expo that equipped an IBM Personal System/2 Model 95 with symmetrical multiprocessing capabilities.

Working in concert with Aox's OS/Master software, the MicroMaster MP 486 is a modular set of Micro Channel boards that takes advantage of existing hardware and software.

For instance, at last month's demonstration a single-process-

sor Model 95 was capable of running SCO's MPX multiprocessing software to form a tightly coupled symmetrical multiprocessing system. MicroMaster MP 486, due next year, will also be capable of running Unix International's System 5.4.

Aox officials also showed off OS/Master's asymmetrical or distributed processing capabilities coexisting with MicroMaster MP 486's symmetrical multiprocessing.

"The distributed multiprocessing [of OS/Master] allows

the symmetrical multiprocessor to coexist with it," said Chris Adams, vice president of marketing. "So in the OS/Master environment we can create a virtual PS/2 environment running a different operating system — such as Novell, DOS, Unix — on each board in the system," he said.

Besides the 33-MHz 80486 host processor, the demonstration included two other 33-MHz 80486-based boards. Each board has its own 128K cache, 16 megabytes of main memory, and were coupled together with a 64-bit wide proprietary bus that allowed any one processor to see all memory in the system as if it were its own.

"So if you had four boards in the system you could have ready access to 64 megabytes of memory," Adams said.

The MicroMaster MP 486 works in two modes. The first is what Adams calls upgrade mode, where users can plug the board into a Model 50, for

example, and have it take over the system, turning an 80286-based system into an 80486 computer.

The second is OS/Master mode, where the OS/Master software and the MP 486 board work together to create a virtual PS/2 environment, where the planar board and all other MicroMaster boards can equally participate in the computation.

"If you have a Model 80 board network server that is making out and are looking at the prospect of getting another, what we can offer is a board you can insert that expands your existing hardware," Adams said.

"We are seeing strong demands in things like process control or in any application with real-time applications that wants to distribute processing across multiple processors and get deterministic response times," Adams said.

Aox Inc., 486 Totten Pond Road, Waltham, MA 02154; (617) 890-4402.

PRODUCT SPOTLIGHT



LightningScan Compact Debuts

A new portable scanner for the Macintosh has been introduced by Thunderware. The LightningScan Compact is designed to attach to the Mac Classic, SE/30, Portable, or SE equipped with a SuperDrive via the disk drive port. Because it does not need a power supply or a separate controller, the device weighs only about 5 ounces, and can scan 4.2-inch-wide images at resolutions as high as 400 dots per inch. The suggested price for the scanner is \$359.

Thunderware, 21 Orinda Way, Orinda, CA 94563; (415) 254-6581.

ScanMatch calibrates color scanners

BY TUESA A. GRAOOS

Savitar Color Communication has announced ScanMatch, a scanner calibration software used to capture accurate color images on computer screens for the Macintosh.

ScanMatch is designed to transform RGB color values produced by the scanner into RGB color values that have been matched to the user's monitor.

The Macintosh-based program bridges the gap between the scanner and the screen by calibrating continuous-tone color from the input device. The software package consists of Macintosh-compatible software and a reflective color target.

"Basically, we're positioning ScanMatch as a utility for getting good color from your scanner," said Rudolph Burger, president of Savitar.

The application reads and writes standard Mac TIFF and PICT2 image files and requires that Tektronix's TekColor color management software be installed.

Savitar will display the software at MacWorld and the Color Connections Conference, in Boston next month.

ScanMatch will be bundled with a number of Mac-based flatbed scanners. It supports most popular scanners, including Microtek's MSF 3002, Sharp's JX300, JX450 and JX600, and the Howtek Scanmaster scanner. It will also be available separately to users for a suggested \$99, Burger said.

Savitar plans to start shipping the product in August.

Color imaging products capable of producing color-calibrated output are already available, including monitors and some printers capable of producing color-calibrated hard-copy output.

Savitar Color Communication, 139 Townsend St., Suite 203, San Francisco, CA 94107; (415) 243-3030.

ATI adds stereo sound boards to FX line

BY TOM QUINLAN

ATI Technologies Inc. is going after the sound/graphics market with two new additions to its FX line.

The stereo sound boards, the VAudio FX and the Audio FX, are designed to provide stereo sound for PCs, along with compatibility for Microsoft Corp.'s Multimedia Windows.

The Audio FX board supports a dynamic range of up to

100 decibels, a selectable sampling rate of 44 kHz, and comes with 8-bit stereo DACs.

An optional MIDI connector supports simultaneous MIDI In and Out for multitrack recording.

The sound board includes a microphone jack, amplifier, and software.

In addition to the sound capabilities of the Audio FX, the VAudio FX board merges audio capabilities and VGA

graphics on a single board.

The board supports 15-bit color and comes with Color Depth Enhancement technology, increasing the apparent color display from 32,768 colors to more than 262,000 colors.

The boards will ship in the third quarter. Their list prices will range from \$300 to \$500.

ATI Technologies Inc., 3761 Victoria Park Ave., Scarborough, Ontario, Canada, M1W 3S2; (416) 756-0718.

PIPELINE

From page 23

ANNOUNCEMENT

Intel offers design kit to push 386SL portables

Intel Corp.'s SL Microprocessor Super-Set Evaluation Kit, a reference design kit for systems designers, should enable manufacturers to more quickly come to market with portable systems built around Intel's low-power 386SL. The \$4,385 kits are compatible with the ROM BIOS from five different companies. (408) 765-4943.

Ventek Corp.'s recently introduced TrueColor 1024x41 24-bit color card supports 16.7 million colors with resolutions as great as 1,024 by 768 pixels. A version with 3 megabytes of on-board memory lists for \$1,499.

Everex Systems Inc.'s Macintosh subsidiary, EMAC, is offering a pocket-size external fax/modem for the Macintosh portable. The \$495 EMAC 25-96 combines a 2,400-bit-per-second (bps) modem and a 9,600-bps facsimile system. (800) 821-0806.

Metropolis Corp.'s 5¼-inch 760-megabyte hard drive offers a 15-millisecond average seek time. The Model 18-24 lists for \$1,795. (818) 709-3300.

Spectragraphics's SqueezeeCad board features a Texas Instruments 34010 microprocessor, 1,024-by-768-pixel noninterlaced resolution, and software specially designed for use with AutoCAD. Release 11. Its list price ranges from \$795 to \$995. (503) 641-2200.

Computer Peripherals Inc. broadens its line of memory expansion products for Hewlett-Packard Co. printers with two models. The HP LaserJet line gets the Ex-pannder, which features 1 megabyte of memory in conjunction with a CPI JetMemory board. DeskRAM is a 256K memory cartridge for the DeskJet family. Both products list for \$24.95. (800) 498-8848.

Priam Systems Corp.'s recently introduced Winchester hard disk subsystems are created for laptop, notebook, and portables users. The 120-megabyte LP-120 has a suggested price of \$1,827; the 212-megabyte LP-200 is suggested at \$2,541. (408) 954-8680.

Fora Inc.'s Super VGA 10-inch monitor weighs less than 16 pounds. The \$699 Adonics Mon-5C1 comes with a one-year warranty. The company introduced two other VGA, noninterlaced monitors with maximum resolutions of 1,024 by 768 pixels. The \$699 Mon-7C8A features a 26-millimeter dot pitch and silted screen. The \$899 Mon-7C8B, an ultra VGA multisync monitor, has a 28mm dot pitch. (408) 944-0393.

UPGRADES

Ontrack disk partitioner steps up to System 7.0

System 7.0-savvy Disk Manager Mac, from Ontrack Computer Systems, can create disk partitions from which users can boot their Macintoshes with System 7.0, 6.5, or AUX operating systems. The enhanced software lists for \$69.95

and works with most SCSI drives. (800) 752-1333.

Silicon Graphics Inc.'s \$795 StudioVision is now available for its InVision graphics board, enabling users to record visualization scenes, walk-through models, and voice narrations on video tape. In addition, \$95 drivers for AutoCAD, CADkey, and SCO Open Desktop have been added to InVision. (415) 960-1980.

ALLIANCES

Floptical group forms to delineate standards

A group of seven manufacturers have joined forces to establish an industry standard for 3½-inch, 21-megabyte floptical technology. The Floptical Technology Association currently consists of Insite Peripherals, Iomega Corp., Hitachi Maxell, 3M, Adaptec, Future Domain, and Rancho Technology.

SHIPPING

HP monitor views world as black and white

Hewlett-Packard Co.'s page-white monitor features black text on a white screen. Designed primarily for file servers and PCs running word processing applications, the \$299 14-inch monitor supports resolutions as high as 620 by 480 pixels. (800) 752-0900.

Designed specifically for the text terminal market, 14-inch, interlaced color and gray-scale terminals from **Relays Inc.** are compatible with PCs, Macs, and some minicomputer systems. The color TR-170, \$895, and the gray-scale TR-65, \$545, use a Motorola 68000 processor. (408) 945-9000.

Output Technology Corp.'s EuroLine printer operates at only 48 decibels, making it one of the quietest impact printers on the market today. The EuroLine comes in two configurations: 400- and 600-line-per-minute output speeds. Prices range from \$5,495 to \$6,995. (800) 488-8788.

MDB Systems Inc.'s 3½-inch DataCartridge 500-E can be configured with as much as 500 megabytes of storage and lists for \$520. The \$500 DataCartridge 2000-E in a 5¼-inch form factor can be configured with as much as 1.6 gigabytes of storage. (714) 998-6900.

The Complete PC's Half-Page Scanner, for the Macintosh includes Version 2.0 of its SmartScan gray-scale image editing software. The package includes the scanner, interface card, AC adapter, SCSI cable, user's guide, and SmartScan 2.0. It lists for \$399. (408) 434-0145.

AirMouse Remote Control, from **Seletech Ltd.**, enables users to control interactive computer and video systems. The \$595 product is compatible with the Commodore Amiga, the Macintosh, and DOS-based Windows-based systems. (802) 655-9600.

Everex Systems Inc.'s \$359 Excel 120F is a QIC-80 compatible 120-megabyte floppy tape backup unit that includes data compression, tape backup, and backup management software. (415) 498-1111.

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TECH TALK / Steve Gibson

Visual Basic: not the ultimate programming environment

sieged by an unrelenting stream of individuals and companies who have taken my applause of Microsoft's accom-

plishment as an implicit denial of their lives' fundamental purpose.

I did intend to say that Visual Basic is going to be a stunning market success. It marvelously leverages the underlying power of the Windows graphical environment while providing amazing ease of use. However, these people seem to believe that I also implied Visual Basic

was immaculately conceived — flawless and whole. (Well, perhaps I did.) Let me now establish a wider perspective about where Visual Basic really fits in.

Is Visual Basic my ultimate programming language? Absolutely not. For one thing, there are a lot of things wrong with Basic. For example, I'm continually annoyed by Basic's "implicit" variable

declarations. Basic implicitly, or "spontaneously," creates variables on the fly as they are encountered during a program's execution. Back when allowable Basic variable names were A through Z with an optional digit suffix, it was hard to misspell a variable name; however, that's all changed.

Contemporary programming style dictates that a variable's name should convey its purpose. Consequently, I always use such variables as "TotalNumberOfFields" by concatenating multiple descriptive words. But had I misspelled "Number," Visual Basic would not complain. It would simply create a new variable with an initial value of zero. Then, rather than referring to the variable I've intended, Visual Basic will now refer to a new item, without my knowledge. This sort of typo bug is very hard to find because we're only human, and we tend to see what we expect to see. All well-behaved languages require authors to explicitly declare variables prior to their use. Without this simple change, Basic is destined to remain a toy language.

Basic's semantics also lack much of the flexibility and power provided by the C languages' arguably too-powerful semantics.

Although C's expressive potency certainly allows poor C programmers to become entangled in unreadable code, it provides a number of handy shortcuts that can dramatically increase overall performance while shortening source code and enhancing program readability.

In C, for example, a variable may be incremented by either prefixing or postfixing a pair of "+" signs. The Basic language requires the variable name to be called out twice: "Variable = Variable + 1." C's simpler statement of the same thing, "++Variable," makes the programmer's intention more clear. This is especially true with long and complex variable expressions that would require a close inspection of each variable reference to be certain that the same expression is being used.

Another gripe I have is Visual Basic's incapability to create, or "instantiate," dialog boxes on the fly. Without dropping down to Microsoft Windows SDK's level, there's no way for Visual Basic code to create a form with controls. Subroutine library collections would therefore be forced to include precreated forms, which is also not readily possible within Visual Basic.

Visual Basic is a remarkable victory that fulfills the needs of the masses; however, because it is built upon Basic's aging and somewhat weak foundation, it will probably not appeal to our industry's most serious developers. Having written many satisfying interactive applications with Visual Basic under Windows, I find that my wish list has grown quite long. In light of all these little gripes, I plan to gain some much needed objectivity by forcing myself to stop using Visual Basic and to develop competence with several of the alternatives.

I'm still searching for my ultimate Windows development environment.

Steve Gibson is the developer and publisher of *Spiriteer* and president of Gibson Research Corp. of Irvine, California. The views expressed are his own.



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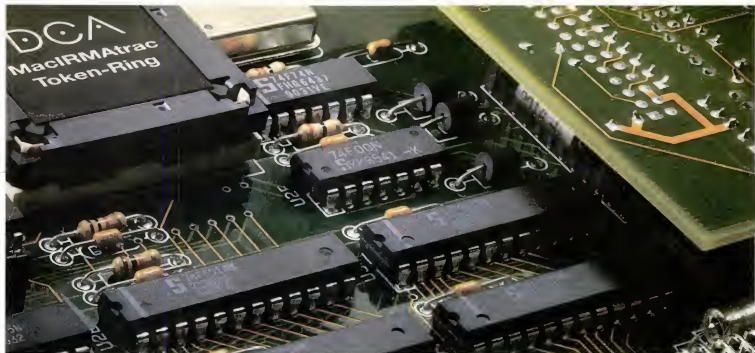
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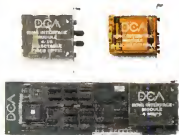




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- ☐ 02. Manufacturer (non-computer-related)
- ☐ 03. Finance/banking/accounting/insurance/real estate
- ☐ 04. Government, federal (including military)
- ☐ 05. Government, state and local
- ☐ 06. Retailer/distributor/wholesaler
- ☐ 07. Consulting/engineering/architecture/construction
- ☐ 08. Research and development
- ☐ 09. Health/medical/legal
- ☐ 10. Communications/publishing/broadcasting
- ☐ 11. Transportation/utilities
- ☐ 12. Hotels/management/non-profit organizations
- ☐ 13. Education, college/university
- ☐ 14. Education, schools K-12
- ☐ 15. Other non-computer-related business

Computer-Related Businesses

- ☐ 16. Computer consultant/networking consultant
- ☐ 17. Computer manufacturer (hardware, software, peripherals, etc.)
- ☐ 18. Computer distributor/wholesaler
- ☐ 19. Computer retailer
- ☐ 20. VAR/VAD/systems integrator
- ☐ 21. Other computer-related business

2 WHICH OF THE FOLLOWING BEST DESCRIBES YOUR TITLE? (PLEASE CHECK ONE ONLY.)

Computer Systems/Operations/Networking

- ☐ 30. MIS/IT Director/Manager
- ☐ 31. Microcomputer Manager
- ☐ 32. Networking Director/Manager
- ☐ 33. Data/telecommunication Manager
- ☐ 34. Information Center Manager
- ☐ 35. Microcomputer Specialist
- ☐ 36. Programmer/Systems Analyst
- ☐ 40. Other computer-related professional staff specialist

Management

- ☐ 41. Chairman/President/Owner/Partner
- ☐ 42. COO/Controller/Treasurer
- ☐ 43. CFO
- ☐ 44. Vice President/General Manager
- ☐ 45. Department head or manager
- ☐ 46. Other management

Professionals

- ☐ 49. Consultant
- ☐ 50. Professional
- ☐ 55. Other listed personnel

3 WHICH OF THE FOLLOWING BEST DESCRIBES YOUR DEPARTMENT OR PRIMARY JOB FUNCTION? (PLEASE CHECK ONE ONLY.)

- ☐ 75. MIS/OP
- ☐ 76. Networking/Communications
- ☐ 77. Information center/Microcomputer center
- ☐ 78. Operations
- ☐ 79. Engineering
- ☐ 80. Research and Development
- ☐ 81. Accounting/Finance
- ☐ 82. Administration/Management
- ☐ 83. Manufacturing/Quality Control/Purchasing
- ☐ 84. Consulting
- ☐ 85. Sales/Marketing
- ☐ 86. Education/Training
- ☐ 99. Other _____ (please specify)

4 ARE YOU A MEMBER OF A COMPANY-WIDE PC AND/OR SOFTWARE COMMITTEE?

☐ Yes ☐ No

5 IN WHICH WAYS ARE YOU PERSONALLY INVOLVED IN YOUR ORGANIZATION'S DECISIONS TO PURCHASE THESE PRODUCTS? (CHECK ALL THAT APPLY.)

	1. Determine Need	2. Determine Features	3. Evaluate Brands	4. Specify/Recommend Brands	5. Specify/Recommend Vendor/Supplier	6. Authorize the Purchase	9. None of These
A. Microcomputers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Peripherals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Software	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Data Network Products (LAN/WAN)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6 DO YOU RECOMMEND, BUY, SPECIFY OR APPROVE MICROCOMPUTERS, SOFTWARE, AND/OR PERIPHERALS? IF YES, PLEASE INDICATE FOR HOW MANY PERSONAL COMPUTERS OR MICROCOMPUTER SYSTEMS YOU HAVE THIS INVOLVEMENT. (PLEASE CHECK ONE ONLY.)

- ☐ 01. 2,000 or more ☐ 08. 200-499 ☐ 04. 10-24 ☐ 99. None of the above
- ☐ 02. 1,500-1,999 ☐ 07. 100-199 ☐ 03. 7-9
- ☐ 03. 1,000-1,499 ☐ 06. 50-99 ☐ 02. 4-6
- ☐ 09. 500-999 ☐ 05. 25-49 ☐ 01. 1-3

7 OVER THE COURSE OF ONE YEAR, DO YOU RECOMMEND, BUY, SPECIFY OR APPROVE MICROCOMPUTERS, SOFTWARE, PERIPHERALS, OR SERVICES WORTH: (PLEASE CHECK ONE ONLY.)

- ☐ 11. \$2,500 or more ☐ 07. \$400,000 to \$599,999 ☐ 04. \$50,000 to \$99,999 ☐ 01. Less than \$10,000
- ☐ 10. \$100,000 to \$249,999 ☐ 06. \$200,000 to \$399,999 ☐ 03. \$25,000 to \$49,999 ☐ 99. None of the above
- ☐ 08. \$600,000 to \$999,999 ☐ 05. \$100,000 to \$199,999 ☐ 02. \$10,000 to \$24,999

8 DO YOU SPECIFY, RECOMMEND, BUY, OR APPROVE THE PURCHASE OF ANY OF THE PRODUCTS OR SERVICES LISTED BELOW:

☐ Yes (if yes, please check all that apply) ☐ No

Computers

- ☐ 01. PC and PC/XT class desktop (8086-8088)
- ☐ 02. PC/AT class desktop (80286)
- ☐ 03. 8086-class PC's desktop
- ☐ 04. 8086-class PC's laptop
- ☐ 05. Workstations (Sun, DEC, Next, HP)
- ☐ 06. PS/2 Models 25, 25LX and 30 class desktop (8086-8088)
- ☐ 07. PS/2 Models 50, 50z and 60 class desktop (80286)
- ☐ 08. PS/2 Models 70 and 80 class desktop (80386)
- ☐ 09. Laptops (greater than 7 lbs.)
- ☐ 10. Notebooks (less than 7 lbs.)
- ☐ 11. Minicrash
- ☐ 12. Other microcomputers
- ☐ 13. Minicomputers
- ☐ 14. Mainframe computers

Software

- ☐ 16. Spreadsheets
- ☐ 17. Financial/plotting or modeling
- ☐ 18. Accounting
- ☐ 19. Word processors
- ☐ 20. Text retrieval or search
- ☐ 21. Relational database management
- ☐ 22. Flatfile database management
- ☐ 23. Desktop publishing
- ☐ 24. Graphics/presentation
- ☐ 25. Drawing or plotting
- ☐ 26. CAD/CAM/CAE
- ☐ 27. Knowledge bases (i.e., technical, reference data)
- ☐ 28. Project management
- ☐ 29. Communications
- ☐ 30. Integrated software (i.e., Smart, Symphony)
- ☐ 31. Utilities
- ☐ 32. Programming/languages
- ☐ 33. Expert systems/medical intelligence
- ☐ 34. Personal information management
- ☐ 35. File security and encryption
- ☐ 36. Back up
- ☐ 37. Operating system software
- ☐ 38. Statistics
- ☐ 40. Other

Peripherals

- ☐ 41. Dot matrix printers
- ☐ 42. Laser printers
- ☐ 43. Ink-jet printers
- ☐ 44. Color printers
- ☐ 45. Plotters
- ☐ 46. High-speed line printers
- ☐ 47. Other printers or plotters
- ☐ 48. Monochrome monitors
- ☐ 49. Color monitors

- ☐ 50. Full-page monitors
- ☐ 51. Other monitors
- ☐ 52. Multi-function boards
- ☐ 53. Turbo or accelerator boards
- ☐ 55. Video display boards
- ☐ 56. Memory boards
- ☐ 57. FAX boards
- ☐ 60. Other boards
- ☐ 61. Keyboard
- ☐ 62. Mouse
- ☐ 63. Scanning devices
- ☐ 66. Other input devices
- ☐ 67. Diskette drives (5.25 or 3.5 inch)
- ☐ 68. CD-ROM or optical disk drives
- ☐ 69. Hard disk drives
- ☐ 70. Tape drives
- ☐ 71. Other disk drives

Data Communication/Local Area Networks/Wide Area Networks

- ☐ 73. Modems 2400-9600 BPS
- ☐ 74. Modems greater than 9600 BPS
- ☐ 77. Fingert sharing devices (print servers)
- ☐ 78. Protocol converters
- ☐ 79. Network operating systems
- ☐ 80. Network E-mail programs
- ☐ 81. Network-integrated PC applications
- ☐ 82. Network interface cards
- ☐ 83. Internetworking equipment (gateways, bridges, routers)
- ☐ 84. Micro-to-mainframe equipment (i.e., 3270 emulation boards)
- ☐ 85. Network file servers
- ☐ 86. Multiplexers

Other services

- ☐ 90. Education/training
- ☐ 91. Application development
- ☐ 92. Maintenance service contracts
- ☐ 93. Rental or leasing agreements
- ☐ 94. On-line services

Miscellaneous products

- ☐ 96. Diskettes
- ☐ 97. Surge protectors
- ☐ 98. Consumables (paper, ribbons)
- ☐ 99. Other

PLEASE TURN THIS FORM OVER AND ANSWER QUESTIONS ON THE BACK.

**INFO
WORLD**

OR ORGANIZATION:

9 HOW MANY PEOPLE ARE EMPLOYED AT YOUR LOCATION?

(PLEASE CHECK ONE ONLY)

- ☐ 08 10,000 or more ☐ 04 100-499
☐ 08 5,000-9,999 ☐ 03 25-99
☐ 07 2,500-4,999 ☐ 02 10-24
☐ 06 1,000-2,499 ☐ 01 Less than 10
☐ 05 500-999

10 HOW MANY PEOPLE ARE EMPLOYED IN YOUR ENTIRE ORGANIZATION, INCLUDING ALL OF ITS BRANCHES, DIVISIONS AND SUBSIDIARIES?

(PLEASE CHECK ONE ONLY)

- ☐ 10 20,000 or more ☐ 05 500-999
☐ 09 10,000-19,999 ☐ 04 100-499
☐ 08 5,000-9,999 ☐ 03 25-99
☐ 07 2,500-4,999 ☐ 02 10-24
☐ 06 1,000-2,499 ☐ 01 Less than 10

11 ARE THERE ANY MAINFRAME OR MINICOMPUTERS AT YOUR LOCATION?

☐ Yes (If yes, please check all that apply)

- ☐ A Mainframe ☐ B Minicomputer

DID YOU REMEMBER TO SIGN AND DATE YOUR APPLICATION?

12 TYPES OF PERSONAL COMPUTERS OR MICRO-COMPUTER SYSTEMS AT YOUR LOCATION?

☐ Yes (If yes, please give the quantity below for each model)

☐ No

Machine Type and Model	Currently Own	Plan to Purchase Within 12 Months
Microcomputers		
A. PC and PC/XT class		
B. PC/AT class		
C. PC's based on 80386 chip		
D. PC's based on 80486 chip		
E. PS/2 Model 25, 30		
F. PS/2 Model 50, 60		
G. PS/2 Model 70, 80		
H. Laptops		
I. Notebooks		
J. Macintosh		
K. Engineering workstations		
L. All other		
LAN's		
M. Total # of LAN's		
N. Total # of PC's connected to those LAN's		
O. Total # of file servers		

13 ENVIRONMENTS, OFFICE AUTOMATION PLATFORMS, AND/OR LAN OPERATING SYSTEMS UTILIZED AT YOUR LOCATION.

(PLEASE CHECK ALL THAT APPLY)

- ☐ 01 MS-DOS or PC-DOS ☐ 11 Novell's Netware
☐ 02 Windows ☐ 12 AppleTalk/AppleShare
☐ 03 Unix or Xenix ☐ 13 IBM's PC Network
☐ 04 OS/2 ☐ 14 IBM's OS/2 LAN Server
☐ 05 Macintosh ☐ 15 Tops
☐ 06 IBM Office Vision ☐ 16 Banyan Vines
☐ 07 DEC All-in-One ☐ 17 Microsoft's LAN Manager
☐ 08 HP Net-Wave ☐ 18 Other (please specify)
☐ 09 AT&T Rhapsody
☐ 10 NCR Corporation

14 THE PERSONAL COMPUTERS OR MICROCOMPUTER SYSTEMS AT YOUR LOCATION HAVE THE FOLLOWING COMMUNICATIONS CAPABILITIES:

(PLEASE CHECK ALL THAT APPLY)

- ☐ 01 Communicate with modems via modem
☐ 02 Local area network
☐ 03 Communicate with internal company mainframe or mini
☐ 04 Communicate with outside service bureau, database, or time-sharing service
☐ 05 Voice/data
☐ 06 None of the above

15 THE PERSONAL COMPUTERS OR MICRO-COMPUTER SYSTEMS AT YOUR LOCATION ARE NORMALLY PURCHASED FROM:

(PLEASE CHECK ALL THAT APPLY)

- ☐ 01 Retail computer store ☐ 04 Mail order firm
☐ 02 Manufacturer ☐ 05 Other (please specify)
☐ 03 Distributor/wholesaler/system house ☐ 06 None of the above

INFO WORLD

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 Northbrook, IL 60065-3013



PLACE
POSTAGE
STAMP
HERE

16 WHICH OF THE FOLLOWING PUBLICATIONS DO YOU RECEIVE ADDRESSED PERSONALLY TO YOU?

(PLEASE CHECK ALL THAT APPLY)

- ☐ 01 Byte ☐ 05 NetworkWorld
☐ 02 Communications Week ☐ 06 PC Magazine
☐ 03 Computerworld ☐ 07 PC Week
☐ 04 LAN Times ☐ 08 PC World



NETWORKING

PIPELINE

ALLIANCES

Digital to peddle Proteon products

Digital Equipment Corp. will sell Proteon Inc.'s family of token ring and internetworking products, including PC adapters, bridge/routers, wiring hubs, and management software. (508) 493-5111.

UPGRADES

Horizon sees LANs through Windows

Scan the landscape with Horizon Technology Inc.'s LAN Auditor 2.0, which automatically audits PC configurations on Novell, Banyan, and LAN Manager networks. Version 2.0 has a Windows or DOS interface and monitors information on MCA or EISA boards, configuration files, and hard disk partitions. The 50-user price is \$495; additional groups of 100 cost \$295. (619) 292-8320.

Fresh Technology Co. (a Q-Asset 5.1), a \$175 memory-resident print job queue manager that works from within applications, now supports Windows 3.0 and gives multiple users access to Novell PRINT.

For .NET files, it also comes with a pop-up Capture Flags window for looking at the network printing status. Version 5.1 supports Novell NetWare 2.X and 3.X. (602) 497-4200.

Tame your E-mail with **Musant Software Inc.'s Wildcat 3.0**, a bulletin board system that gives users access to host-based bulletin boards, and offers messaging and file transfer features. Version 3.0 includes gateways to MC Mail and CompuServe and costs from \$129 for a single-line version, to \$499 for 250-line version. (805) 395-0223.

ANNOUNCED

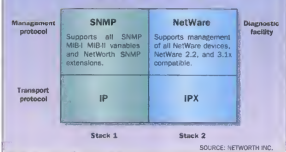
Spectrum offers host software

Spectrum Concepts Inc.'s XCOM/SDM allows host-resident software to be electronically distributed to PCs over a LAN. The as-yet-unpriced software is slated to ship in the fourth quarter. (212) 766-4400.

Ungermann-Bass' Fault Tolerant Power Supply, which works with the U-B Access/One smart wiring hub, is due to ship next quarter. (800) 873-6381. Pricing is not yet available.

Continued on page 36

EtherNet series 4000 network interface card



The EtherNet wiring concentrator contains dual protocol stacks for SNMP and NetWare Diagnostic management.

Dual management for EtherNext 4000 offered

BY DAVID COURSEY

NetWork Inc. has developed a dual protocol approach to managing its EtherNext Series 4000 intelligent wiring concentrator.

EtherNext 4000, due to be released in August, supports both Novell's NetWare Diagnostic facility running on Internetwork Packet Exchange (IPX) and Simple Network Management Protocol (SNMP) on Internetwork Protocol (IP), according to John Hale, president of NetWork. The management agent software running in the EtherNext consists of dual protocol stacks.

NetWork's agent supports both SNMP Management Information Bases (MIB) I and II, as well as NetWork-specific extensions for greater management capabilities. The company will offer its MIB for use with management systems from Micro Technologies, Wollongong, Cabletron, Sun, NetLabs, and others.

"You can't really manage the

end-user unless you support IPX," Hale said. But large corporate networks are moving toward SNMP for enterprise-wide management, which is not supported by NetWare. By supporting both protocols the concentrator can be monitored by management consoles that support NetWare diagnostics or SNMP.

NetWork's strategy is an industry first, according to Hale. An early user described this capability as nothing short of revolutionary because existing mainframe management products don't provide LAN management. "We're a total NetWare/IPX house, but we also have a mainframe that uses TCP/IP and will be adding Unix boxes throughout the house," said Kary Burns, network manager at Alta Health Strategies Inc., in Salt Lake City. "Managing the whole thing is a real headache," he said.

NetWork Inc., 8101 Ridgepoint Drive, Irving, TX 75063; (800) 544-5225.

Oracle readies TCP/IP for NetWare

Oracle Corp. database users will be able to link to Novell NetWare and Macintosh servers in the enterprise environment with upcoming TCP/IP support.

The company, based in Redwood Shores, California, plans to ship this fall a NetWare Loadable Module allowing its database server for NetWare 386 to communicate over TCP/IP internetworks.

TCP/IP support for Macintosh servers is also forthcoming, but company officials said they had no delivery date.

Currently, Oracle Server for NetWare 386 database is access-

sible only to clients on NetWare 386 network running native NetWare SPX/IPX protocols.

TCP/IP in Oracle for NetWare will allow Oracle servers to talk to non-NetWare clients over an internetwork and to service their queries. The Oracle server will also query non-Oracle servers linked to a TCP/IP system. The TCP/IP protocol suite will be provided in Oracle's SQL*Net NLM, the "glue" that links Oracle's database to the underlying network. The software will be available as part of Oracle for NetWare.

—Yvonne Lee

Multivendor user group launched

OURS industry group was first proposed by Novell CEO Ray Noorda

BY LOUISE FICKEL

NEW YORK — The Open User Recommended Systems group (OURS) was born recently at PC Expo under the approving gaze of Novell Inc.'s CEO Ray Noorda.

Noorda first proposed the group last February.

The group's mission is to focus industry attention on user priorities: conduct benchmark tests of multivendor product configurations; and encourage vendor cooperation in service, support, education, system design, product compatibility, and integration.

The group consists of representatives from Chase Manhattan Bank; Lockheed Missiles and Space Co. Inc.; Shell International Petroleum; Chemical Waste Management; Texaco Chemical Co.; Telecom Australia; the federal Centers for Disease Control; Rogers Cable systems Ltd.; and Morgan, Lewis and Bockius. Members plan, implement, and maintain multivendor networks.

The group's steering committee is expected to meet in Salt Lake City in September to identify more specific objectives and establish guidelines for vendor participation.

The group's formation is the result of Novell efforts to recruit

potential members. Novell pledged to fund facilities, travel, and support services for the steering committee, said member Carl Scase, vice president of information systems at Rogers Cable Systems. Other vendors have also offered funding.

Eighteen additional vendors showed support for OURS, including IBM, Hewlett-Packard Co., Sun Microsystems Inc., Compaq Computer Corp., Ashton-Tate Corp., Borland International Inc., and Oracle Corp.

The group will be unique in its capability to help members see the "big picture" of enterprise computing, rather than simply focusing on one vendor's product or a single technology, as is the case with many vendor-specific user groups, Scase said. OURS is not a standards group, nor is it a Novell advocacy group, he emphasized.

Vendors hope that participating in the group will help them strengthen ties with users. For example, 3Com hopes to explore product development plans with the group, according to Alan Kessler, 3Com vice president of network systems.

OURS differs from the Technical Support Alliance in that the latter is a vendor consortium designed to improve multivendor service and support to customers.

AT&T Computer Systems releases StarWAN updates

BY DAVID COURSEY

AT&T Computer Systems is now shipping enhanced versions of the StarWAN Multi-Bridge and StarWAN Brouter with the goal of increasing user configuration options.

The StarWAN Multi-Bridge 2.0 is a transparent translation bridge that can now be configured in four ways: bridging four Ethernet networks; two or four Ethernets to one Fiber Distributed Data Interface (FDDI) network; or FDDI to FDDI. The earlier version offered only two options: Ethernet-to-FDDI or FDDI-to-FDDI bridging.

Protocol support includes OSI, IP, IPX, DECnet, XNS, and AppleTalk I and II, AT&T

said. The base unit is \$4,000. An FDDI module set is \$11,500; an Ethernet Access Unit is \$5,750.

The AT&T StarWAN routers, manufactured by Cisco Systems Inc., now include support for frame relay, token ring, AppleTalk Phase II, and Banyan Vines networks.

The routers also support Source Route Bridging (SRB), capable of routing token ring traffic that is based on information provided in the routing information field of token ring frames.

Frame relay is included with an X.25 firmware option, priced at \$300 to \$3,350, based on the router model. A 4-megabit-per-second token ring interface is \$3,800.

A true of power, and

*Current DOS users can purchase a 5.0 upgrade package. To order your version of DOS 5.0, see your IBM Authorized Reseller, or call 1-800-IBM-7699 to order a single copy. IBM, Personal System/2 and PS/2 are registered trademarks and Micro Channel is a trademark of International Business Machines Corporation. 386 is a trademark of Intel Corp. © 1991 IBM Corp.

story frame SX.

IBM brings its mastery of i386™ SX to a variety of new models.



When it comes to 386 SX technology, IBM just about wrote the book. Right from the start, the IBM PS/2® Model 55 SX hit the bestseller list, making it the leading 386 SX machine. And now IBM is opening a whole new chapter with 20 MHz models specifically designed to be more flexible and expandable.

The Personal System/2® Model 57 SX brings new levels of value to a Micro Channel™ PS/2, providing data integrity and increased performance in connected and multitasking environments. It comes with a new generation 2.88MB diskette drive and SCSI on the planar. The popular 55 SX has also been upgraded. It offers affordable Micro Channel performance, now with 4MB RAM and 40 or 80MB hardfiles. And our two newest AT-bus PS/2s deliver powerful performance at practical prices. The 40 SX offers full desktop expandability while the 35 SX packs its power into a smaller footprint. And with 132-column screen support, a new 122-key keyboard and IBM software, all new models can also run existing mainframe host terminal applications.

IBM also has new ways to improve PS/2 performance, starting with a new, faster, more user-friendly DOS 5.0. It requires less memory, yet offers advanced functions like built-in task switching and a full screen editor.* The new PS/2 3.5" Rewritable Optical Drive offers 127MB media capacity with a 66-millisecond average seek time, and the new Model 8504 12" monochrome display lets you view it all with high resolution and clarity.

To get the full story, including our "PC Trade-In Offer," contact your IBM Authorized Remarketer or IBM marketing representative. For a remarketer near you, call 1 800 272-3438, ext. 386.

Models 35, 40 and 57 SX feature i386 SX 20 MHz processors, 16-bit VGA and 5.25" internal drive capability. 80/160MB hardfiles are available on the 57 SX; 40/80MB on the 40 SX and 35 SX. Memory is upgradable to 16MB with 4MB standard on the 57 SX, 2MB on the 35 SX and 40 SX. The 40 SX and 57 SX each have five expansion slots and four DASD bays; three slots and two bays on the 35 SX. A medialess 35 SX LAN station model is also available with a Token-Ring Adapter standard.



How're you
going to do it?
PS/2 it!

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Users can store, access data in FileNet's WorkFlo

BY YVONNE LEE

FileNet Corp. recently introduced the WorkFlo Business System designed to help corporations transform paper-intensive operations.

WorkFlo software is designed to move electronic documents and images among users in a workgroup.

The Windows-based WorkFlo Business System combines optical storage and image scanning, allowing users to capture, store, and access data. It also lets users integrate computer-generated data via the Microsoft Windows Dynamic Data Exchange protocol.

WorkFlo will run on Novell NetWare systems running over token ring, Ethernet, and fiber-optic links. The WorkFlo system includes an OSAR (optical storage and retrieval) jukbox for image storage and a scanner, which is sold separately from the WorkFlo software.

Burroughs Welcome Co., a large drug company, uses WorkFlo to manage product development information. WorkFlo was integrated into the firm's existing Ethernet and token ring networks to process 2,500 pages of clinical data daily, according to Hal Bredbenner, Burroughs image project manager.

WorkFlo comes with a suite of development tools including WorkFlo Desktop for PC imaging applications, WorkShop scripting toolkit, and WorkFlo AutoForm, which creates forms.

WorkFlo Desktop costs \$935 per PC. A version packaged with AutoForm is \$2,399. The WorkShop automation tool is \$7,995. WorkFlo Development Kit for Windows is \$7,995.

FileNet Corp., 3565 Harbor Blvd., Costa Mesa, CA 92626; (714) 966-3400.

Cayman adds DECnet support to Gatorbox 2.0

Cayman Systems Inc. has added DECnet support to its line of Ethernet gateway products, giving Macintosh users access to Digital Equipment Corp.'s VMS services.

With the new enhancements, Cayman's GatorBox series can simultaneously route AppleTalk, DECnet, and TCP/IP protocols. The GatorBox CS can call on such network services as terminal emulation, file sharing, and printing. These services can all be accessed from the Communication Tool Box in DEC's Pathworks LAN connectivity product.

DECnet support lets Macintosh users talk with DECnet users and share printers and other devices on Ethernet networks through the GatorBox CS.

Cayman has also shipped Release 2.0 of its GatorShare AppleShare-to-NFS file sharing software with character mapping. Cayman Systems Inc., University Park at MIT, 26 Landsdowne St., Cambridge, MA 02139; (617) 494-1999.

—Ed Scannell

PIPELINE from page 33

ANNOUNCED Network Software 3270 emulator is easy on RAM

Network Software Associates Inc.'s multisession Distributed Function Terminal (DFT) 3270 emulator for DOS-based systems uses only 77K of RAM for a single LU Type 2 session. The 3270/ElitePlus emulates an IBM 3270 or 3279 display station plus one or two 3287 printers and supports as many as

five concurrent sessions. The software can be used with a variety of PC-to-host links and most SIDL and coax adapter cards. A single-user version is \$395; a network license for use with the NSA AdaptSNA LAN Gateway is \$1,295. (800) 352-3270.

Ungermann-Bass is incorporating Reduced Instruction Set Computing (RISC) into its Enterprise Hubs and a new message-passing bus optimized for communications processing. The as-yet-unpriced RISC-based cards will ship by

year end. (409) 562-7896.

Network Corp. plans to sell a Windows interface to simplify switching back and forth between Windows and DOS and sending and receiving messages in both environments, the company said. Network for Windows is priced at \$49 for two users, \$199 for 10 users, and \$749 for 50 users. (617) 738-5295.

Xircor Inc. has added to its line of pocket laptop adapters with a 3270

Wrong.

“ you need look no further than
FoxPro, Version 1.02.
This \$795 database from Fox Software
has succeeded dBASE as the industry
leader in innovation, power, and speed—a
winning combination.”

—PC Magazine 5/28/91

Write.

Don't get us wrong—we love the quote. And FoxPro 1.02 really was that good.

But we've just released FoxPro 2.0. And it's more innovative, more powerful, and far, far, faster.

You'll have to write (or call) for details, but here are some of the highlights:

In tests against IBM's DB2 on a mainframe,

FoxPro on a PC was 4 times faster querying a million-record, 200 megabyte database.

And against other PC database management systems like dBASE and Paradox, it's devastating, thanks to our patent-pending Rushmore™ query optimization techniques.

The DBMS that acts like a Mac and runs like a mainframe. In DOS.

On top of its state-of-the-database-art performance, FoxPro 2.0 with its CUA-like interface gives you the ease-of-use of a Graphic User Interface (GUI) on your character-based DOS PCs.

You use pulldown menus to open multiple windows you scroll through, reposition and resize using keyboard shortcuts or a mouse.

Our Fourth Generation Language (4GL) tools make screens, menus, reports and labels a snap. Create your own custom data entry and viewing screens just by picking-and-clicking to position data, buttons, check boxes and scrolling lists



adapter that attaches to a 3274/3174 control unit on the IBM mainframe. The \$695 Pocket 3270 lets laptops, which lack expansion slots, connect to the mainframes. (818) 878-7600.

ALLIANCES

Cabletron, SGI to jointly develop, market products

Cabletron Systems Inc. and Silicon Graphics Inc. have agreed to sell each others' products. Cabletron will promote SGI Iris 4D workstations with SGI's

NetVisualizer network traffic monitor. SGI will resell Cabletron's SNMP-based Spectrum device-monitoring software, recently ported to the Iris platform. The system is due in the fourth quarter and will start at \$50,000.

Bityx Corp. has inked an agreement with CrossComm Corp. to incorporate CrossComm's Fast Packet Switching technology into its Maestro Intelligent Technology Hub. The hub is scheduled to ship by the middle of next year. (508) 480-0840.

Gilbert and Associates Inc. has joined forces with Saros Corp. to ship Viewz 1.0 for Microsoft Excel for Windows. A \$199 front end to Saros' Mezzanine engine, Viewz lets users locate and manage their files across a network. Features include version control, templates for forms and documents; automatic assignment of billing information to projects and clients; and access control. Through the end of September, users can buy both Viewz for Excel and Viewz for Microsoft Word for \$295.

(213) 454-7679.

UPGRADES

Domain NetWare 386 Driver adds 3.11 support

Domain's updated FDU-NV386 Novell NetWare 386 Disk Driver now includes full support for NetWare 386, Version 3.11; removable media; and drives identifying themselves as "NetWare Ready." As a stand-alone product it retails for \$150, (714) 253-0400.

SHIPPING

On Technology package blends E-mail, editing

On Technology Inc.'s Instant Update workgroup software for the Macintosh combines document processing and electronic mail capabilities, which allow groups of workers to cooperate on projects. The two-user pack sells for \$495; the five-user pack costs \$995. (617) 876-0900.

The Cellular Data System CDS 120 from Vital Communications lets laptop and notebook users transfer data at speeds as high as 15,000 bits per second and is capable of sending voice messages via a cellular voice network. The \$3,299 system comes with an MNP 10, V.42bis internal modem, a handset, an antenna, a serial cable, a vehicle adapter, a charger, and Microcom's Carbon Copy Plus software. Fax machines, recording machines, and internal fax modems can be plugged into the system. (516) 294-5424.

Telebit Corp.'s Asynchronous Communications Server (ACS) takes on dial-up security via an optional Extended User Authentication (EUA) package that includes an encryption board for the ACS. In addition, users can purchase one or more RemoteKeys, credit card-like devices that require users to enter their password in order to gain access to the LAN. The EUA option is \$995 for ISA and \$1,195 for Micro Channel. RemoteKey devices are \$150 each. (408) 734-4333.

Intel Corp.'s NetPort print server lets users connect printers anywhere on a Novell NetWare token ring LAN without shutting down the file server. The NetPort can run at either 4 or 16 megabits per second. It comes with Intel Flash memory, which lets users change the ROM's configuration with software. This means that LAN administrators can upgrade all of the NetPort servers on the network from any workstation. The \$1,195 NetPort, due to ship in two weeks, comes with software that eliminates the need for a NetWare Value Added Process (VAP) or a NetWare Loadable Module (NLM). (503) 629-7394.

PROMOTIONS

Vinzant practically gives away NetWare SQL utility

A \$5 shipping and handling charge will get you Vinzant Inc.'s Windows 3.0 Interactive SQL Utility for NetWare SQL, which lets users enter SQL statements in one window and then see the results in another. It includes support for Dynamic Data Exchange (DDE) and storage of SQL statements in files for retrieval and execution later. (219) 763-3881.



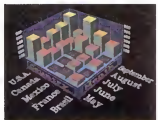
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Eicon gateways link SNA, OSI, and ASCII hosts

BY YVONNE LEE

Eicon Technology Corp. plans to ship gateway software that allows workgroups to connect their LANs to Systems Network Architecture (SNA), Open System Interconnection (OSI), and ASCII hosts simultaneously, using a single network adapter card. The shipping is scheduled

for later this month.

New York-based Eicon is the first vendor to run the CCITT OSI protocols and IBM SNA protocols on a single adapter card, said Maki Wulkan, Eicon's executive vice president.

The new OSI Gateways will be available in a LAN version for Novell NetWare, Microsoft LAN Manager and

other NetBIOS networks, a stand-alone PC gateway for DOS, and another for OS/2-based PCs.

Concurrent operation of OSI and SNA gateway software will let multiple users connect with multiple destinations over a single X.25 line. A single physical connection can link a network to IBM mainframes, AS/400 midrange computers,

X.400 Message Handling Services, and public databases.

Although current market demand for OSI is small, demand is expected to grow considerably in light of the U.S. government's GOSIP (Government OSI Profile) requirements and European acceptance of OSI.

For customers currently using the standard TCP/IP internetworking protocol standard, Eicon will offer a TCP/IP gateway by late summer, Wulkan said.

The OSI LAN Gateway is \$795. PC gateways for DOS and OS/2 are \$195 each.

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Pinpoint sends bulletins across local network

Raindrop Software Corp. is enhancing its Pinboard electronic notes software with the ability to attach notes to LAN-based files and send messages to other users.

Pinboard is an electronic version of a bulletin board with notes tacked onto it. Pinboard is a Windows 3.0 desktop application that lets users organize notes, to-do lists, and messages.

The enhancements to this year-old product include the ability to search all Pinboard bulletin boards on a network, the ability to scan a menu of network-based files that users want to attach notes to, and the ability to send notes and file attachments to other users on a network, said Drew Berkemeyer, Raindrop director of sales and marketing.

Pinboard allows a user to create a note without leaving the Windows application he is working in. Through support of the Windows Dynamic Data Exchange protocol, Pinboard can be integrated with other electronic mail packages and desktop applications.

To send a note over the network, users simply click the notes icon and drop it on top of the network icon. Users can create personal bulletin boards and group boards over a network.

The Pinboard starter pack is \$129, 5-user extender pack, \$399; 10-user pack, \$699; and 25-user pack, \$1,495. Pricing for current users ranges from \$19.95 to \$249.95.

Raindrop Software Corp., 845 Arapahoe Road, Richardson, TX 75081; (214) 234-2611.

—Louise Fickel



Raindrop Software's Pinboard Notes for Windows lets users create electronic notes on their desktop bulletin board.

PERSPECTIVES

The office that isn't there

Paper will someday disappear; some think the future office will, too

BY DAVID COURSEY

Does Bill Gates' concept of "Information at Your Fingertips" sound vaguely familiar?

Probably, because Microsoft's vision of the future office isn't so different from anyone else's. They all seem to have one thing in common: Concepts of a decade ago remain where they were then—somewhere on the horizon.

So says analyst Judith Hurwitz, who believes that taming technology to improve office productivity has proven more complicated than anyone imagined.

"It used to seem like all we had to do was put a terminal on someone's desk to give them access to files," said Hurwitz, of The Seybold Office Computing Group, in Boston. "Now we have to give them electronic mail. Data access is next."

DREAMS UNREALIZED. Every advance in office automation only creates new demand, causes us to realize how much remains to be done, or changes our expectations altogether.

"We keep adding stuff, but we're not closer," Hurwitz said. One such unfulfilled goal is the "paperless office"—an idea as legendary as it remains mythical. Or even unattainable. Today information is being committed to paper only to be redone and reprinted. You can almost hear the trees wincing.

Instead of less paper, Hurwitz believes American businesses today are using more paper than ever before thanks to copying machines and the preponderance of laser printers. Creating and revising documents has become almost too easy, she said.

Futurist Paul Saffo believes the nature of paper has changed. Once used as a stor-

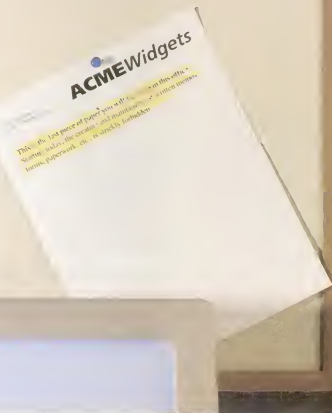
age medium, Saffo sees paper becoming primarily a display medium. Although magnetic and optical media are already replacing filing cabinets for storage, paper still gives people a ready means of viewing some types of information.

"We've shifted from paper as storage to paper as interface. It is an ever more volatile, disposable, and temporary display medium," said Saffo, a research fellow at the Institute for the Future, in Menlo Park, California.

Having played a leading role in flooding workers with

inexpensive photocopies, Xerox Corp. is also doing its part to bridge the gap between paper and electronic documents by offering such tools as optical character recognition (OCR) technology.

Through OCR from Xerox and a myriad of other vendors, workers can scan their paper documents into a computer, converting them into editable text and graphics files. By converting a paper document into a digital form, a worker creates a "live" document that can be changed more easily than the paper version.



The future is no office

nontraditional offices should only increase in popularity as workers realize they don't have to be in a glass and steel tower to get their work done. In fact, sometimes "the office" is the last place employees should be hanging around.

Companies that have lost an office-at-home option — at least part time — are already losing workers to those that do. Salespeople in particular can better spend their days being close to customers rather than their bosses.

That is the philosophy David Grimes used to convince his employer to practice work-at-home techniques. Grimes, a Dallas-based sales vice president with AT&T, was dismayed at how much time his sales force spent at their desks.

"Now, their office is wherever they are," said Grimes, who has spent several million dollars outfitting 800 salespeople with notebook computers, pagers, cellular telephones, portable printers, and customized applications.

Using this "virtual office," Grimes' employees need show up at the physical office only for occasional meetings. This

is especially valuable for salespeople who cover territories away from major cities, he said.

It also saves money for AT&T. Savings come from reduced office expenses such as rent, utilities, and support staff; in addition, greater revenue is generated by field salespeople who are truly based in the field.

"I think it's great now, but I was reluctant at first," said Colette Majerle, an AT&T account representative in Kansas City, Missouri. Majerle, a 13-year veteran of the company, became a technology convert when she saw how much productivity she gained.

Besides productivity, this virtual office may also bolster the economy in some regions. The Kentucky State Science and Technology Council — along with GTE, South Central Bell, and the Kentucky Office of Business and Technology — is currently working on a feasibility study for a project that would set up "telework" centers. Facilities such as private residences and existing vacant office space would house these offices in rural and depressed areas as a means of bringing in jobs.

Non-traditional office efforts



Los Angeles County Telecommuting Project — About 1,700 employees work from a home office part-time as part of this telecommuting project. The project seeks to train employees and managers about the discipline and mind-set required for telecommuting. Through training, the program helps managers overcome the apprehension to trust that employees are doing the work and helps assimilate employees into their new work environments.



AT&T Language Line Service — With offices in Monterey, California, and staff spread across the United States, the Language Line provides simultaneous translation for over 140 different languages and dialects to those subscribing to the service. This service cannot work within the normal confines of the traditional office as translators are on-call all over the country to meet subscribers' needs.

The Kentucky State Science Technology Council — The council is part of a project involving GTE, South Central Bell and the Kentucky Office of Business and Technology. It is currently studying the feasibility of developing telecommuting centers as a means of bringing jobs into rural and depressed areas.

Future office / from page 39

Paper will someday disappear; the office may too

Despite the love affair people still have with paper, document management systems are sure to play a major role in the office environment of the future. These systems will have an even bigger role as workers adapt to creating and passing documents in electronic form.

However, this trend could take a while to become established because image management systems are expensive — especially OCR technology. Besides the cost of scanner and text recognition software, users must ante up for large disks to store documents and fast machines necessary to support image management.

HERE AND NOW. Two manifestations of this future office that have been widely implemented are electronic mail and its verbal cousin, voice mail. Vendors are already promoting products that combine the two or include fax capabilities.

The Complete PC, for instance, markets a PC add-on board that acts as an answering and fax machine for home offices. Small-business users are also

To receive this electronic information, AT&T plans to offer customers a single mailbox for collecting data, image, voice, fax, and other types of messages. Eventually the company hopes to convert fax messages to voice, and vice versa, allowing any type of incoming message to be translated into virtually any type of outgoing message.

Already, users of AT&T Mail can have their electronic messages read to them by an electronic voice, a feature becoming available for LAN-E-mail systems as well.

Adding voice, however, is only the beginning. Remember the video phone? This contraption allowed any two callers with these devices to view each other on a monitor while they spoke on the phone.

But although multimedia — which combines voice, data, video, and image capabilities — may not make its way into mainstream applications soon, bits and pieces are already starting to arrive.

Video conferencing, for example, skyrocketed during the Persian Gulf war as companies cut back on international and even domestic travel. Proponents of the technology say video conferencing is already cost-effective for some users and will become more so as the hardware and transaction costs decrease.

THE APP TO END ALL APPS. Some analysts believe the "killer application" of future generations will merge office applications and communications into the capability to do real-time work with a small group of widely dispersed people.

In such an environment, office groups could interact entirely on-line. Full-time

Some tasks may remain in the human realm because they are so dynamic that human intuition is required.

tion video would provide for face-to-face meetings, and an intercom feature would allow users to speak to someone directly without having to use a traditional telephone or dial and number — clicking on an icon of someone's face might open an audio link to someone in person.

Such a system could offer widely dispersed groups of workers the ability to interact much as though they were in the same building.

One system being demonstrated by Bell Laboratories uses Integrated Services Digital Network (ISDN) services to allow a group of workers to edit a document in real time; the changes appear on each worker's screen as they are made.

ISDN services will be available from the regional Bell companies in major cities within the next 24 to 36 months, according to a study by Bellcore, the research arm of the local Bell companies.

ISDN is likely to be implemented and provide a base for future development.

WORKING TOGETHER. Cooperative applications will play a key role in automating the future office, said International Data Corp. analyst Ann Palermo.

These cooperative technologies come in a variety of flavors, dubbed client/server, groupware, and work-flow automation, among others. Each attempts to combine individual pieces of a business — which may or may not be automated already — into a hybrid application that works better than just the sum of its parts.

Palermo believes the closer a company is allied to its automation, the greater its chances for success. This has already been seen on the factory floor, where large businesses have saved billions of dollars through just-in-time manufacturing.

In the office, automation has been important, though so far limited mostly to supporting individual users or taking over routine but important functions such as payroll and order processing.

Although local area networks have been widely implemented, little has been accomplished to help workgroups be more successful. Palermo points to applications such as Lotus 1-2-3 and the AT&T/NCR Rhapsody and Cooperation systems as signs that this is changing.

Moving toward such a "work-flow" system, capable of automatically routing work from one person to another along a predefined or ad hoc path, will be painful for many companies. "It will force them to look at what they do in a completely different way," Palermo said.

Businesses will be forced to create, or recreate, the information flow of their entire operation in software and systems. But while work-flow applications promise convenience and improved productivity, they will never replace human-to-human interaction. Basically, there

are jobs people like to do or are unwilling to give to a machine, no matter how capable it might be. People may choose tasks that give them direct interaction with others or provide an outlet for competitive urges.

Other tasks may remain in the human realm because they are so dynamic that human intuition — gut instinct — is required. Though electronic administrative assistants and other automated systems can help with the small decisions, large ones are likely to require a person to shift through computer-generated analytics.

Another factor against work-flow applications is that, unlike personal productivity tools, which can be implemented as needed and in the order desired by individual users, these applications work only if the entire group uses them. "You need a champion to be at the helm and convince people to use it," Palermo said.

But as a few early adopters learn to prosper on the backs of workgroup systems, others will be forced to buy systems of their own to remain competitive.

KEEP THIS IN YOUR POCKET. Nicholas Negroponte, cofounder and director of the MIT Media Laboratory, subscribes to the idea that computers check-off of capabilities — fax, phone, and data — will be small enough so that we may one day wear them as we would a wrist watch.

With all this power being jammed into these small computers, it's no small wonder that we may all be wearing our offices in our coat pockets. For that matter, the future office is no office. And with no office may come the paperless office, because if you have no place to put paper, you're not going to have it.

That should make a few trees breathe a little easier. □

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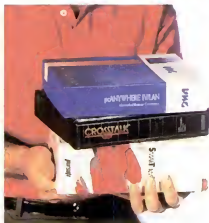
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TO THE EDITOR

Thoughts on the redesign

Having just finished the June 17 issue of *InfoWorld*, I wanted to send in an unsolicited comment on the new format. By and large, it looks good, and I like everything you did different except the back inside page. Please leave the Q&A column in place and intact, and don't scale down the size of that or the Cringely column. Your new Pipeline feature is nice, but that's not the format for Quindlen, Alsop, or Cringely column!

Mark Beret

I missed the Macintosh News page in the June 24 *InfoWorld*. I did notice the "Macintosh" subheadings on several articles, which may be your way of making up for doing away with the concentrated Mac page. I would like to see the Mac page reinstated. As a consultant, I use your magazine to keep current on the desktop computer industry; however, I am most interested in Mac. I did notice more color photographs and color type, which improves the look of your publication.

The business section in the back of the magazine looks good; however, I miss the Alsop/Quindlen column above Cringely's column on the back page. Usually when such changes are made there is some mention, but I didn't see anything in this issue.

Roger Harmon
Tucson, AZ

RESOURCES

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29-30, Chicago: Image World Chicago combines Video Expo and the CAMMP Show. Contact: JoAnn Minsker, (800) 800-KIPPI.

AUGUST

14-16, Boston: Windows & OS/2 Conference. Contact: CM Ventures, (415) 601-5000.

19-22, New Orleans: The eighth annual Information Center Conference and Exposition. Contact: (617) 542-0146.

SEPTEMBER

5-7, Anaheim, CA: Intech '91, the International Technology Conference & Exposition. Contact: Exhibition Development Manager, (800) 262-3378, (617) 290-0400.

8-11, San Diego: "Managing the Move to Workstation-Based Development" is sponsored by the Development Center Institute. Contact: (317) 846-2753.

8-13, Boston: Software Development Week. For information, contact: (415) 905-2630.

10-12, Los Angeles: The Downsizing Expo will help prepare MIS and general business professionals to deal with the downsizing trend. For information, contact: (508) 470-3870.

Return to simplicity

Cringely's quote of Borland's Philippe Kahn (June 10, page 118) saying "Basic is to programming what crack is to your brain" really bothers me. Kahn, like so many others in the industry, seems to think that Borland's programs are the only programs on a machine; that full-time programmers are the only programmers; and that users have unlimited learning time. They are ignoring the majority of users who are not computer experts and for whom the computer is only one of many tools needed to do a job.

What happened to the days when programs were compact and simple? Revisions kept getting bigger and more complex, not smaller and easier to use.

Carter Harrison
Beaverton, OR

No 'struggle' with Macs

In the June 17 issue, Steve Gibson ("DOS 5.0 brings worthwhile, not breathtaking, improvements," page 30) challenges the readers of Tech Talk to "Compare this number with the machine you're currently running . . . referring to his '640,336 largest executable program size.' So I did."

My desktop computer shows 7,201,800 (about 7 megabytes) as its largest unused block of application memory. So I'd guess that I have no need to "stand in the line to get . . . this new ver-

sion of DOS." And I can't say that I have ever been someone "who spends inordinate portion of his life reconfiguring and rebooting his machine in a constant struggle to get the absolute maximum amount of free memory for application software."

What is this? Just an Apple Macintosh. And since I am running System 7.0, I could (if I could think of something to do with it), set up 16 megabytes, 32 megabytes, or 66 megabytes (that happens to be all of the free disk space I have for Virtual Memory) of application memory. Cope a couple of controls in the memory control panel and reboot. That's it. But right now, 7 megabytes does nicely.

I have enjoyed, and have a great deal of respect for Mr. Gibson's technology tutorials, such as the recent series on data compression. Perhaps if he didn't have to "struggle" with his machine so much, we could have even more of his great articles. Hmm. Sounds like increased productivity, doesn't it?

R. Garry Hornbuckle
Senior Computer Engineer
Networking
Apple Computer Inc.
Nashville, TN

Please write to Letters, InfoWorld, 1060 Marsh Road, Menlo Park, CA 94025; (MCI Mail: 259-4127; CompuServe: 73267.1537). Letters can also be faxed to (415) 328-1049. Include your name, address, and daytime telephone number. Letters selected for publication will be edited for length and clarity.

18-20, Washington: The Network and Distributed Systems Management '91 conference will focus on integrated management of multivendor computer systems and networks. Contact: (213) 394-8305.

22-25, Monterey, CA: CIO Perspectives Executive Conference is for executives involved in the strategic direction, management, and implementation of information technology. Contact: (800) 366-0246.

23-24, Boca Raton, FL: The second annual Advanced Network Computing Forum. For information, contact: (407) 395-3000.

23-27, New York: Image World New York combines Video Expo and the CAMMP Show. Contact: JoAnn Minsker, (800) 800-KIPPI.

OCTOBER

1-4, San Jose, CA: The 1991 Seybold Publishing Conference and Exposition. Contact: (312) 457-5850.

6-10, Chicago: The Society for Information Management Annual Conference. Contact: (312) 644-6610.

7-8, Portland: Ninth Annual Pacific Northwest Software Quality Conference. Location: Oregon Convention Center. For information, contact: Terri Moore, (503) 223-8633.

7-11, San Jose, CA: "Computers and Communications Coming Together" is the theme of Interop '91 Conference and Exhibition. Contact: (415) 941-3399.

15-17, New York: CMA Telcom '91 is divided into networking strategies, technology, international networks, telecommunications, and facility management. Contact: (800) CMA-EXPO.

28-30, New Orleans: Electronic Messaging '91. (703) 875-8620.

DECEMBER

10-11, San Francisco: The PC Windows Exposition and Conference. Contact: (800) 777-6006.

15-18, San Antonio, TX: Hypernet '91. Contact: John J. Leggett, (409) 845-0298.

18-19, Baltimore: The Baltimore Computer Conference and Exposition will feature more than 150 leading computer and information system vendors. (800) 638-8510.

InfoWorld welcomes notices of national conferences, trade shows, and meeting schedules of professional data processing, MIS, information center, and microcomputer management associations or support groups. Send notices to Resources, InfoWorld, 1060 Marsh Road, Menlo Park, CA 94025, or by fax at (415) 328-1049. No local training or education seminars, please.

FUTURE TENSE / Paul Saffo



Computers spell the doom of corporations as we know them

The corporation as we know it is headed for the scrap heap of business history. Internal

corporate structures are already mutating beyond recognition. Management hierarchies are flattening, and as economist Peter Drucker has noted, teams are replacing individuals as the basic work unit in companies struggling to compete in more complex and uncertain markets. But far more profound change lies ahead. This will be the decade when the shape of corporate boundaries begins dissolving.

The driving force behind these changes is the convergence of computers and communications into an emerging global telepresence, a dizzyingly complex electronic universe of financial and transactional links and channels. Just as highways and telephone networks shaped the modern corporation for most of this century, the coevolution of organizational structures and telepresence technologies will yield new business models.

Traditional corporations are structure-driven. Their typical response to an outside threat or opportunity is to reorganize. In contrast, telepresence organizations will be relationship-driven, favoring amorphous internal structures and the capability to rapidly make and break external partnerships and alliances. Relationships will be defined more by communications channels than by legal documents. Before the lawyers have packed their bags, technicians will be connecting new partners together onto the data highways at the heart of the telepresence world.

The first signs of this shift are already evident. Automobile manufacturers, such as General Motors, require suppliers to link into huge corporate electronic data interchange (EDI) networks coordinating the movement of parts and finished products. Once these links are made, it is hard to tell where one company stops and another begins. An auto-parts supplier may be an independent corporation on paper, but its fate is tied to its customer as completely as any corporate division.

In the financial world, traders rely on a global financial network to execute more complex transactions involving momentary relationships among uncountable numbers of entities.

Giving name to the entities that are likely to succeed today's corporate model is a special challenge. Terms like *hypercorporation* and *metacorporation* evoke the flexibility that the new entities are likely to exhibit, while *cybercompany* suggests the tie to enabling telepresence technologies.

My favorite, though, is *virtual company*. Coined by SeniorNet vice president Richard Adler, it neatly captures the notion that what looks like a company may be something entirely different. For example, a collection of smaller companies could use EDI links and a single commercial name to appear as one large corporation.

This is already occurring at a modest level today. Next time you open your inbox, read the fine print on the Ocean

Spray cranberry juice bottle. Ocean Spray is not your usual corporation but a "growers cooperative" formed by Massachusetts cranberry farmers.

But the sheer variety and interconnectedness of business structures to come goes far deeper than any of these examples or terms suggest. Relationships among companies in the next century will

be profoundly symbiotic. Symbiosis captures the essence of a new business landscape where organizations will be defined more by their relationships than by organizational boundaries. We will see companies emerge to exploit highly specialized business niches created by other companies.

Just as flowers and bees have co-

evolved into complex interdependency, businesses are likely to mutate into entirely new interlinked arrangements. One biologist even suggested that we label our new business animals *symbianies*. The term is unlikely to survive on the business savanna, but the underlying principles are certain to guide the shape of organizations to come.

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Paul Saffo is a Research Fellow at Institute for the Future, in Menlo Park, California.

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TEST DRIVES

FIRST LOOK / Raphael Needleman

Desktop for Windows allows consistent Windows interface

Apple's System 7.0 depresses me. Its user interface is smooth, intuitive, and consistent. And I use a PC.

More than a year ago, Windows 3.0, a great improvement over the flat and clunky Windows 2, brought the PC's user interface closer to the Mac in terms of ease of use. But before Microsoft could really catch up, Apple released System 7.0, leaving PC users in the user interface dust.

Symantec aims to close that crucial gap a little more with its Norton Desktop for Windows, a replacement for the Windows shell (the Program Manager) that incorporates a more consistent user interface, an integrated file manager, and some nifty features, such as an "erase" icon into which you drag files. Sound familiar?

Let's hope that Apple's legal minions don't think so, because this product is a giant step toward making Windows a real user's operating environment.

THE DESKTOP. The Norton Desktop offers everything you can find in the Windows Program Manager and more. It displays drive icons down the left side; clicking one opens a file manager window with tree view of the drive's directories and files. Norton's file manager is faster and easier to use than Windows 3.0's widely despised file manager.

Programs can be launched directly from the file manager, as can documents. It is easier to associate document files with programs than it is in Windows. Also, since the program and file managers are tightly linked, copying data files icons into group files is a snap.

In Norton Desktop, program groups can be nested. For example, you could set up a group called "Utilities" and put "Windows Utilities" and "DOS Utilities" groups in it.

On the lower right of the Norton Desktop you'll find "tool" icons such as the SmartErase. This not only works as an analog of the Macintosh trash can, but tracks program deletions so you can undelete them later. SmartErase can also use the delete tracking and file protection schemes of DOS 5.0 and PC Tools. The SmartErase tool will even work on network drives by moving "deleted" data to reserved files.

The tools continue with a very capable file viewer, which can display data from several word processors, spreadsheets, databases, and graphics



programs; and a printing utility, which will open the program that created the document and print it. You can have multiple printer icons if you have more than one printer.

The last of the tools is Norton Backup for Windows (also sold separately), a fast and easy-to-use backup program; its main drawback is that it doesn't yet support tape drives.

All of these tools are tightly integrated into the desktop. Files (or entire disks), can simply be dragged from the File Manager or the desktop onto the tools, which then launch automatically.

The Desktop itself has several more features, such as an improved "File Properties" menu item that lets you browse for icons as well as program files (with an extremely well-designed browser), set up hotkeys for applications, and—when the menu item is brought in association with a file or directory—change file attributes.

The Norton Desktop is almost the Windows that Windows should have been. As a straight replacement for the Windows Program Manager, it is well worth the cost.

THE TOOLS. But that's not all. Norton Desktop also comes with a Windows version of the Norton Utilities' System Information program, which has been adapted well for this package. It displays more about your computer and peripherals than you would ever want to know, and several of the on-screen reports feature graphics and "hot" areas that open up even more detail about the item you point to.

The SuperFind program will search your disks for specified search strings. This utility, like many in the Desktop, can work in the background once you get it going. You can view or launch files directly from the SuperFind "Found" window, even while it continues to search for more files.

A Batch Builder utility lets you program relatively complex Windows functions into icons that you can put on your desktop. I found the on-line help made it easy to begin creating simple batch programs. The Norton Desktop also includes an integrated task scheduler, which can run a batch file, or any other program (like Norton Backup) on an hourly, daily, or other schedule.

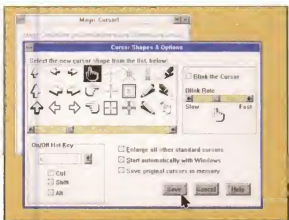
Finally, the Disk Doctor tool examines your disks for problems. Disk Doctor can't fix what it finds while Windows is running, but an included Emergency Disk—almost the same disk that ships with the Norton Utilities 6.0 for DOS—can boot your computer and attempt to fix the problems if Disk Doctor notices any anomalies.

The Norton Desktop for Windows is an easy recommendation. For \$149, it offers a wealth of utilities and increased Windows functionality. Even with Norton Desktop, Windows is more confusing than the Macintosh Finder, but it sure beats Microsoft's own front end.

The program is scheduled to ship July 15. Symantec Corporation, 10201 Torre Ave., Cupertino, CA 95014; (408) 253-9600.

First Look examines new personal computer products before they have been through a formal review. Executive Editor Raphael Needleman examines other products each week on the Business Radio Network's "Computing Success," Sundays, 1 p.m. to 3 p.m. Pacific time.

SNAPSHOT



Magic cursor lets you customize your cursor in a variety of creative ways.

Magic Cursor makes Windows 3 easy on eyes

If you use Windows 3.0, and especially if you use it on a portable computer, you will be favorably impressed with Fanfare Software's \$49.95 Magic Cursor program.

There isn't much to this little utility, but it does fill a need that many portable computer manufacturers who bundle machines with Windows are only slowly catching on to: the need for bigger, customized cursors within Windows.

The AT&T Safari is one portable that already comes with its own customized, jumbo-size cursors for Windows. But if you often squint at Windows and lose your cursor on a different portable, Magic Cursor makes it easier on the eyes. Fanfare Software, 9420 Reseda Blvd., Ste. 828, Northridge, CA 91324; (818) 886-8787.

—Sebastian Rupley

INSTALLATION SOFTWARE

Software Factory relieves many installation chores

Today's software designers face a confusing array of hardware configurations, complicated by a wide assortment of operating systems. If you write software for sale or distribution, or develop applications for general use within your organization, getting it installed and running on customers' machines can turn your hair gray.

The Software Factory's Ez-Install Installation Aid gives you a quick, easy way to provide nearly bulletproof installation, all the while retaining your natural hair color. The heart of the package is the Installation Aid (IA) utility. IA steps you through the process of creating an automatically installing set of distribution disks.

Once you've defined how you want your software installed, IA generates an installation procedure written in its own interpretive language. Ez-Install

includes archiving and file splitting utilities that will help you fit all of the program files onto the fewest number of distribution disks.

All that remains is for you to run a test installation (ours worked fine the first time), and duplicate, label, and distribute your installation disks.

If you are feeling adventurous, or have unusual installation requirements that aren't handled adequately by IA, you can program directly in Ez-Install's high-level language.

Ez-Install costs \$149 for DOS, \$249 for the OS/2 version, and \$349 for a combination package. The Software Factory charges no royalties or run-time fees.

The Software Factory, 17610 Midway Road, Suite 214, Dallas, TX 75287-6676; (214) 490-0835, fax (214) 306-4552.

—Tom Bigley



Using Desktop for Windows, you can launch programs from the file manager and nest program groups.

TEST DRIVES

MULTIMEDIA DEVELOPMENT TOOLS

Apple's QuickTime reaches for multimedia future

The alpha version of QuickTime reveals Apple Computer Inc.'s vision of multimedia. QuickTime is a Macintosh system extension that allows time-based data types, such as movies, sound, and data from scientific instruments, to be integrated into mainstream Macintosh applications with no extra hardware.

QuickTime has the capability to synchronize audio, video, and other media. It offers a standard approach to managing time-based media data and lets users work with video as easily as they work with graphics. Word processing, database, and spreadsheet documents will soon be capable of supporting animation.

Imagine a database containing people that talk or walk or even graphs that move. Some developers may take the next step to have applications edit and create QuickTime Movie files.

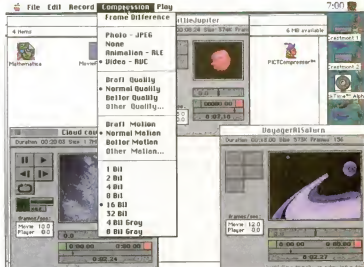
To make QuickTime a reality, Apple has designed a flexible new file format called Movie that handles multiple tracks and all basic types of media elements. QuickTime and its movie format let you distribute animated data without needing an animation engine for display.

This QuickTime alpha version is currently targeted at developers and programmers, but we found it easy to use. Our review copy contained the QuickTime system extension, along with MoviePlayer and PICTCompressor applications. The remainder of the 450 megabytes on the alpha release CD contains documentation, programming examples, system software for Systems 6.0.7 and 7.0, and lots of sample movies and pictures.

Viewing movies, animations, and compressed pictures on the QuickTime CD is easy. QuickTime videos and animations are decompressed directly from a hard disk or CD ROM while they are playing. The frame size and rate are limited by processor speed and SCSI device throughput. If the CPU or the disk is too slow, video frames are skipped to keep up with the sound track. We played movies of 160 by 120 pixels at about 10 frames per second. They played without hesitation from the Apple CD player, with no additional video gear on our Mac IIcx or IIfx systems.

The QuickTime disk contains a number of sample pictures in compressed and uncompressed states. We could see no difference between the two, and the PICTCompressor utility displayed both versions almost instantaneously. On average the uncompressed versions of the samples required about 20 percent more disk space than the compressed versions.

In our view, QuickTime would be a winner if all it did was offer the PICTCompressor feature. For developers, the QuickTime extension comprises three software modules: the Movie Toolbox, the Image Compression Manager, and the Component Manager. The Movie Toolbox includes routines for storing, retrieving, manipulating, and editing movie files. If compression is used, the Movie Toolbox hands the compressed data to the Image Compression Manager to select the appropriate decompressor component for the movie data. The decompressor then sends the decompressed data on to QuickDraw for display. The Component



QuickTime includes a Movie Toolbox that lets you store, retrieve, and edit movie files; files can be compressed.

Manager provides access to software interfaces that manage hardware devices or software resources. This allows applications to communicate with the Component Manager providing device-independent flexibility.

Several vendors have committed to developing for QuickTime.

The alpha release is a tempting taste of QuickTime. The expected ship date is targeted for late this year. Based on the

alpha release, we see no reason why Apple will not be able to release QuickTime this year. QuickTime will result in fundamental changes to the way we all use personal computers. QuickTime requires a 68020 Mac with 2 megabytes of RAM, and System 6.0.7 or System 7.

Apple Computer Inc., 20525 Mariani Ave., Cupertino, CA 95014; (408) 996-1010.

— Doug and Denise Green

Development Kit extends Windows' capabilities

A beta version of the Microsoft Multimedia Development Kit (MDK) that we looked at allows users to upgrade Windows 3.0 to Windows with Multimedia. The MDK provides a collection of programming libraries, source files, and debugging tools required to develop multimedia applications.

Multimedia Windows extends the Windows 3.0 environment to support a variety of multimedia features. These include enhanced sound capabilities, MIDI support, control of external media devices, and the capability to play back MacroMind Director movies.

The MDK contains three parts: Multimedia Windows, Multimedia Data Preparation Tools, and the Multimedia Software Development Kit. After you install Multimedia Windows, you will find that your familiar Windows control panel now lets you configure display drivers, external multimedia devices, joysticks, and MIDI settings.

The new control panel lets you choose from a series of screen savers and lets you specify sound files to play during system events such as startup and error messages.

Multimedia Windows will sport two

new applications. One is the Alarm Clock, which can be set to analog or digital display and can play any available sound at specified intervals. The other is Media Player, which is a simple multimedia

It does not approach QuickTime in terms of adding time-based media elements.

video program that can play a variety of multimedia files containing sound, MIDI, animation, and CD audio.

Some additions to help developers are the Multimedia Data Preparation Tools. These include five tools that prepare and edit data for use in multimedia presentations. Multimedia authors who develop graphics and sound files and people using tools such as Authorware Professional,

ToolBook, and Guide will want to install the Multimedia Data Preparation Tools.

The first tool, BitEdit, allows you to edit bit-mapped graphics. Although it is not a full-blown painting application, it does make it easy to crop, resize, or touch up bit maps before copying them.

PaletteEdit lets you create or edit color palettes for your bit-mapped images. You can manage palettes in a flexible manner and assign new palettes to existing bit maps.

WaveEdit allows you to edit and play waveform sound files. It presents sound as graphic representations of waveforms and lets you cut, paste, and adjust sound characteristics. It reminds us of Farallon's MacRecorder software in terms of its functionality and user interface.

The final tools are FileWalk and Convert. Together they let you view and edit files and convert them from one format to another.

To take advantage of Multimedia Windows, a user will need a PC with at least a 10-MHz 286 processor, 2 megabytes of RAM, 4-bit VGA graphics, a hard disk, two-button mouse, CD-ROM player, and additional audio support.

Multimedia Windows also requires a SoundBlaster card in order to take advantage of its sound options.

We found the tools to be easy and intuitive. They should open the world of multimedia editing to a greater portion of the PC audience. For developers, the tools and documentation should be complete enough for the creation of Multimedia Windows applications.

The Microsoft Multimedia Development Kit is beta Version-Release 2.

While Multimedia Windows goes a long way toward giving your PC standard Macintosh multimedia capabilities, it does not approach QuickTime in terms of adding time-based media elements as a common part of applications.

However, Microsoft has demonstrated technology that will literally bring QuickTime technology to the PC. It is called Audio Visual Interleave (AVI) and will incorporate digital video capability and software compression technology (JPEG). It is set to be formally announced after the MDK ships at the end of July.

Microsoft Corp., 1 Microsoft Way, Redmond, WA 98052; (206) 882-8080.

— Doug and Denise Green


BUYERS ADVISORY / Brett Glass

IDE drives make it unnecessary to do low-level formatting

Question: My company has been using MFM, RLL, and ESDI drives. We're interested in using IDE drives, but are worried that we can't do a low-level format on these drives. Will the formatting degrade with time?

Question: When you think a virus has infected your hard drive, an obvious cure is to do a low-level format. I've heard that low-level formatting on IDE drive will either do nothing, or it may cause more problems. What's the story?

Frank Burrows

Response: If a low-level formatting program were capable of writing directly to an IDE disk, it might destroy servo information, rendering the drive useless. Reinterleaving the drive would cause similar problems.

However, IDE drives make low-level formatting and reinterleaving virtually unnecessary. Embedded servo markings,

which allow the head to make a mid-course correction after every sector, prevent data from drifting off-track — a common cause of data loss. The low-level formatting information rarely degrades. IDE drives usually contain full-track buffer, so interleaving is not critical. If you unleash a typical low-level formatting program on an IDE drive, the drive will pretend it is low-level formatting but will really just wipe the disk. It's doubtful this will do any harm.

One final note: Some viruses can remain in memory and reformat the disk later, so be careful.

Question: I have a 486/25 with a Maxtor LXT-200 IDE drive at work. At home, I have a 386/25 with a Maxtor LXT-213 IDE drive. The drives are similar. Why do I get much higher transfer rates on the LXT-200?

Bob Floyd

Response: CPU and bus speed matter with IDE drives, because transfers are done using the CPU's string input and output instructions. There are also other possible causes. Are the interface boards the same? Is one requesting more wait states than the other? Are your disks fragmented? Are the BIOSes different? Is *ALUERS* — set differently on the two machines? What about *FASTOPEN*? If your 386's disk feels too slow, I recommend a good disk-caching program (not *SmartDrive*) with at least a 1-megabyte cache.

Question: We've tried unsuccessfully to get ST506 and IDE drives to run on the same computer. We've tried to change the addressing and set jumpers to slave, master, etc. Every technical support number I've called tells us that it is impossible. Is there a clue to this that might help us in the future?

Layne Heiny

Response: The best way to get both drives running at the same time is to use an ST506 controller, which doesn't need the same interrupts and I/O addresses as the IDE drives. Look for an 8-bit board with its own BIOS, designed for the IBM PC XT. It'll be slow, and you might have to try several before you find one that works.

Question: I have an ALR PowerFlex 286 with a 386SX option board, which came with a Western Digital 40-megabyte IDE drive. I recently purchased a Seagate 84-megabyte IDE drive, but I could not get them to work together. Do you know how I can use both?

David S. Goldstein

Response: It isn't a good idea to mix different brands of drives on an IDE cable. When you install two drives, one acts as a "master" and the other as a "slave," and different brands may not cooperate. I'd trade one of the drives with a dealer or a friend to get a matched set.

Contributing Editor Brett Glass answers reader questions on technical issues in this weekly column. Brett cannot answer questions personally and will not make brand-name recommendations. Readers can leave questions by calling (800) 227-8365, Ext. 622 or by messaging Compuserve (72667.3673).

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COMPUTING

SQL in perspective:

Separating myth from reality in the database language

By Fabian Pascal

When it comes to relational database management systems (RDBMSes) and SQL, the PC industry is schizophrenic. On the one hand, DBMS vendors and consultants criticize SQL technology, while on the other hand, they step over each other to claim that the products they recommend and sell are relational, or support SQL. And even though they believe in the market's ability to separate the useful from the bad (leading to the former's success and the latter's failure), critics might compare the increasing market focus on SQL to an noxious gas filling a market vacuum.

Viewed in the proper perspective, SQL is much better than what we had, but worse than what it should (and could) have been. Unfortunately, there are some entrenched misconceptions about the technology that miss both the positive aspects of SQL and its real flaws.



The most superficial critique of SQL is that it is old. Essentially, this implies obsolescence.

SQL aside, note that old things that are sound do not become obsolete easily. For example, logic and linguistics are not being discarded, even though they have been with us for hundreds of years. They are not perfect, but they are the soundest foundations we have. Replac-

Fabian Pascal is president of micro-paSQL, an independent Washington-based consulting firm specializing in relational database management and SQL technology. He advises on database strategy, teaches micro RDBMS seminars, and is author of *SQL and Relational Basics*. The views he expresses are his own.

ing such foundations with new ones that are better is usually a tall order, not likely to happen anytime soon.

The relational approach to database management is based on the mathematics of set theory and first-order predicate logic. This theoretical foundation has been shown to have important practical implications for users. Contrary to what is sometimes claimed, users do not need to master the theory to take advantage of its benefits. If a DBMS, and thus its data language, is relational, users will implicitly experience the practical benefits. Conversely, data languages not predicated on sound foundations end up being more difficult and less powerful for users.

SQL is a data language of explicit relational origins. Where SQL adheres to relational principles, it is much superior (set oriented, less procedural, optimizable, physically independent) to traditional languages. SQL fails precisely where it ignores, or violates, the model's old underpinnings (allows duplicate rows, is not orthogonal, lacks sufficient functionality, is redundant). Ironically, in that sense, SQL should be criticized for not being "old" enough.

The fact is that while SQL has too small a trace of relational soundness and completeness, other data languages in the market do



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not usually have even that. Thus, whatever little loyalty SQL has to the old foundations gives it an edge. Users should never trade down.



A related argument is that SQL precedes the PC. Surely we PC users would not want to have anything to do with mainframe stuff, right?

In reality, many popular PC data management products ignored database fundamentals such as system catalogs, transaction management and recovery, or proper concurrency control, which were well understood in the mainframe database world. It was this understanding of the fundamentals that evoked the relational model, a theory-based (i.e. sound), systematic, general approach to database management. And its objective was precisely to attenuate the problems caused by archaic, ad hoc, proprietary, and complex mainframe DBMS products that caused users to migrate to the PC. However objectionable DB2 (the IBM relational database for MVS mainframes) might be, what cannot be claimed is that it is more archaic than IMS, its older, hierarchical predecessor from IBM.

Thus, SQL as one concretization of the relational model was an attempt to improve on what PC users were then running away from. For this reason, lumping it together with everything that is bad at the mainframe level is misleading.



SQL's IBM origins are frequently held against it. Indeed, IBM was not very careful in designing the language, despite knowing all too well that what it did would be copied in the industry over and over again. Wherever the design of SQL ignored or violated relational principles, users ended up paying a price in practice. But it's certainly not old age that is responsible for the results. Many of the potential problems were known and pointed out to IBM at design time, but the reaction was the same one the industry offers today: a discounting of relational principles as "theoretical" and, thus, of no practical value.

The failure to appreciate the practical importance of relational database theory (which continues to prevail) made the market unable to recognize a better language even when one became available. Those in the industry who claim that a better alternative to SQL is necessary (and I do not entirely disagree) should be aware that one, QUEL, by Ingres Corp. (then RTI, currently a division of Tek Inc.) had to be discarded, because the industry would not accept a language that IBM did not support.

Had users and vendors—including IBM—both understood and related principles and their implications, this may not

have happened. Without such knowledge, nothing can ensure that even a sequel to SQL (and one is not likely to emerge soon) will be better or even accepted.



SQL is also accused of being large, cumbersome, and complicated. Anybody who has used, or understands, SQL knows that, relative to other data languages, the core of SQL is small and simple. Its set orientation, and the simplicity of whatever relational principles it does adhere to, makes SQL more parsimonious; that is, it allows it to achieve the database equivalent of other languages with fewer, but more powerful, commands. And this is no small feat.

For example, because a relational database is nothing but a collection of relational tables (R-tables), SQL has fewer commands than traditional languages: Most are quite intuitive, and some are very powerful. There are only three data definition commands (CREATE, ALTER, and DROP TABLE); four data manipulation commands (INSERT, SELECT, UPDATE, and DELETE); and many retrieval operations are covered by one command (SELECT). There are two transaction commands (COMMIT and ROLLBACK), and two authorization commands (GRANT and REVOKE).

Other data languages incorporated in products on the market operate procedurally on ordered lists, one-record-at-a-time, or on data structures that are much more complex (though not necessarily more expressive) than R-tables, e.g. hierarchies or networks. Consequently, those other languages are burdensome because they must have more lower level, non-intuitive, complex commands. For many database tasks, a few lines of SQL will do the job of several pages of procedural code. In the end, this makes SQL actually simpler in some respects.

Admittedly, because SQL was not carefully designed, either in the relational sense or as a language, it is not as simple or as intuitive as it should and could be, and some of its critics are right to call it on this. This is true of the ANSI/ISO standard dialect, based on a fundamentally flawed process: A committee of about 70 members, most vendors with competing non-relational or SQL products already on the market, cannot possibly design a good language. And it is also true of all sorts of vendor extensions, which strive to interface SQL with lower-level programming languages, or even try to turn it into one.

Thus many SQL deficiencies stem from industry attempts to make SQL similar to, or compatible with, large, unwieldy, and burdensome traditional languages or databases (instead of correcting and enhancing it), sometimes under the pressure of the very same critics who deplore the results.

Sadly, when users are encouraged to educate themselves in relational principles and pressure vendors and standards committees to improve their SQL acts, through either their buying decisions or participation in the language's specifications, they complain that they do not have the necessary time or resources. This is

understandable, but then they should not expect any better alternatives to magically emerge either.



Another argument is that SQL is relevant only where a mainframe needs to be queried, i.e. as a connectivity (or portability) language.

From a user's and developer's perspective, a relational database is a set of logically interrelated tables, regardless of the hardware or operating system. While RDBMSes may differ in implementation details because of internal platform differences, users should be able to work with all RDBMSes in the same logical way. That's precisely one of the major objectives that the relational model—on which SQL is based—tries to achieve: physical data independence—the isolation of users and applications from the peculiarities of the platforms on which databases reside.

In fact, variations in data languages across platforms defeat any "only for mainframes" argument. One cannot help but wonder if the consuming efforts by vendors and users to integrate heterogeneous mainframe and PC data would have been as difficult or costly had relational principles been properly adhered to. Its weaknesses notwithstanding, SQL helps overcome many of these problems and makes portability and connectivity a bit better than what they would have been in its absence. But if that is the case, what sense does it make to continue to use different data languages for PCs and mainframes?

This is not to say that there should not be easier front ends to relational databases, or that SQL is an end-user language. In fact, all SQL DBMSes do offer multiple front ends—some for application developers, some for data administrators, and some for end-users. If they do not, they have only themselves, not SQL or the relational model, to blame, and users should certainly demand such interfaces. But much better front-end tools can be (and are) developed on top of SQL DBMSes than on top of proprietary filers or non-relational DBMSes. And insofar as a command-driven data language is concerned—and at least one must be supported for various reasons (e.g. compatibility, optimization)—there is no technically justifiable reason why SQL should be used only for mainframe connectivity.



With most of the above arguments dispelled, SQL criticism usually deteriorates to one of resource consumption and machine performance (I say "deteriorates" not because these issues are not important—they are extremely important—but because such criticism is misinformed). For example, there is praise

for vendors eschewing SQL in favor of "appropriately microcomputer-size solutions" which "retain a leaner and meaner hot-performance profile." In other words, SQL DBMSes are not acceptable on the PC because they consume considerable system resources—memory and CPU—and perform poorly.

Even if this argument were always true (which it is not), such "leaner profiles" are usually sustained only by leaving it to users to manage dispersed sets of files. There is little system intelligence to manage the database such as a catalog, statistics-based optimization, integrity enforcement, and transaction management. All these must be programmed by users into each and every application. No wonder that compared with true RDBMSes, which perform these tasks automatically and transparently, non-SQL products appear to perform better in certain instances and to consume fewer resources. But evidence shows that the real bottleneck is not the hardware, not the software, resources and performance area. It is much more cost-effective, in the long run, to let the machine—not developers—do most of the database work.

Furthermore, manual optimization is good only temporarily and for a specific application. It is very difficult and expensive to do and maintain. It is error-prone, and it varies by programmer skills. On the other hand, SQL DBMSes have built-in performance optimizers which, given the relational set orientation and the database current statistics in the catalog, are in a much better position to maximize performance in a dynamic, multiuser environment. Optimizers are patient, do not get tired, do not forget, and do not make mistakes, (except those designed into them, of course). Even if current optimizers have weaknesses, they will improve over time.

As the hardware continues to improve, constantly improve, and prices continue to come down, while skilled technical personnel become more and more expensive. Economically, it makes much more sense for vendors to undertake database functions once, in the DBMS, rather than force many developers to do it anew in each and every application. Obviously, vendors would prefer otherwise, but that is not the point.

IN THE FINAL ANALYSIS.

SQL, like many things produced by the computing industry, has flaws. But few of these are raised by its many critics in the PC market. Instead, SQL is attacked in a vague manner, or for aspects in which it is frequently better than the alternatives.

Under these circumstances, even if a better sequel to SQL were to emerge, there is no reason to expect it would be better, or recognized as such in the market place. In fact, certain industry developments—such as the new ANSI/ISO SQL2 standard, vendor SQL extensions, and current "OODBMS" (that is, object-oriented) tendencies—suggest that things may actually become worse.

What is clear is that SQL is certainly not any less problematic than traditional data languages. It would be much more useful to take advantage of what benefits it does offer and pressure vendors to correct its real weaknesses. For now, however, the eyes should be on the relational ball. □

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By Brett Glass

Query optimization: making databases work smart

Database programs perform similar functions, and most use the same query language—SQL or some dialect thereof. However, then, can vendors differentiate their products? One of the best ways a product can distinguish itself, of course, is through performance. And one of the most common techniques to make a database perform well—that is, quickly, efficiently, and without excessive storage requirements—is query optimization.

The purpose of query optimization is to make a database program—and the machine it controls—work smart, not hard. In order to retrieve information efficiently, a database needs to analyze each query it receives and do some planning—hopefully figuring out the shortest route to the goal before it starts sifting through data. The plan must take into account how much data there is, how it's grouped and sorted, whether or not it's been indexed, and what must be done to ensure that the answer is technically correct.

Virtually every database system must do some query optimization in order to be usable. The theory of relational databases doesn't concern itself with how much time, effort, or storage is required to get an answer; it's only concerned with getting an answer that's provably correct.

Here's a simple example of a database query that needs optimization. Suppose a company's database has two tables: EMPLOYEE, a list of employees' names, their employee numbers, and their department numbers; and DEPARTMENT, a list of the departments' names and numbers. If you want names of all employees in your department called "Shoe," a SQL query to

do this would be written:

```
SELECT EMPLOYEE.NAME
FROM EMPLOYEE,DEPARTMENT
WHERE EMPLOYEE.DEPT-NO =
DEPARTMENT.DEPT-NO
AND DEPARTMENT.NAME = "Shoe"
```

According to the formal mathematics of databases, one way to obtain an answer to this query is as follows. First, construct the "join," or "Cartesian product," of the table of employees and the table of departments. The result is a table (see figure) that consists of every possible combination of one row from the first table and one from the second. If you had 1,000 employees and 50 departments, this new table would have 50,000 rows, and the size of each row would be the sum of the row sizes of the two tables you started with. Most of the rows of this new table contain useless information: some data on an employee lumped together with information about a department where he or she does not work. Therefore, the DBMS's next job is to search for rows in which the employee's department number (EMPLOYEE.DEPT-NO) and the department's number (DEPARTMENT.DEPT-NO) match, throwing away the ones where this is not so. Finally, it searches that set of rows for ones where the department name is "Shoe" and returns them as the result of the query.

Relational database calculus says that this method is 100 percent guaranteed to work. However, it's so inefficient that a real-life DBMS would not use it except as a last resort. Rather than constructing every possible answer and then eliminating the ones that are wrong or just plain silly, most DBMSes attempt to streamline the

process without returning an incorrect result. This is the essence of query optimization.

REAL-LIFE STRATEGIES.

Most query optimizations use the same time-saving shortcuts, or heuristics, that a person would use if he or she were processing the query by hand. No sensible human would construct a Cartesian product when handling the query above. Instead, he or she would probably use whatever information was available—including the size of each table, the order in which its rows are stored, and indexes (which make it easy to find certain kinds of data in the table).

An index is one of the best ways to reduce the time it takes to search a table. The DBMS needs to know when an index will be useful to perform a query and also may decide to create a temporary index to speed up a particular query.

Table size may also influence the way in which a smart DBMS approaches a query. In the example above, it's likely that the DEPARTMENTS table will be much shorter than the EMPLOYEES table. Therefore, it may make sense for the DBMS to read the DEPARTMENTS table entirely into memory, then use it to look up department names while running through the list of employees.

The order in which the rows of a table are stored may also be important. For instance, suppose the DBMS knows that it recently sorted the EMPLOYEES table by department number. If it also knows that the last department with the name "Shoes" is department 42, it can stop searching as soon as it finds an employee who is in department 43.

The place where the data is stored and how it is stored may also enter into the plan of attack. If some of the data is already in the system's memory—or in its disk cache—from an earlier transaction, it pays to take advantage of it while it's in easy reach. Also, if some of the data is on a faster storage device, or is stored as a contiguous block rather than being scattered about a disk, it makes more sense to use that data first.

When a DBMS runs on a server and wants to handle similar queries from many clients simultaneously, it can look at more than just the intrinsic properties of the database. For instance, if a company's salesmen are constantly asking for lists of their own sales zones (and, therefore, requiring the DBMS to perform searches based on the identity of the salesman), the server might be able to examine the query history of the database and determine that it's worth indexing it by salesman. This sort of "big picture" optimization is on the cutting edge of database implementation, so many of the big name vendors don't implement it yet.

THEORY VS. PRACTICE.

In an ideal world, these optimizations would go on behind the scenes without the user knowing about any of them. Relational database theory specifically states that the rows of a table have no intrinsic order; any optimization that does rely on knowledge of how they're ordered must be hidden from the user. Similarly, in a "pure" relational database, users never deal explicitly with an

index. If one is needed, the DBMS is expected to create it behind the scenes with no user interaction.

In real life, however, virtually all DBMS programs bend the rules and allow the user to manipulate what goes on behind the scenes. For instance, while the ANSI standard for SQL never mentions a command called CREATE INDEX, virtually all implementations have it—and it's a magnificent time-saver in situations where indexing a table on a specific field will speed up searches. And users who create sequences of queries often know—even though it's never explicitly stated—that using an ORDER BY clause in a query will cause a table to be sorted, getting it ready for a subsequent search.

Problems can crop up, however, when optimization techniques lead to results different from those obtained from the slow, mathematically proven methods. For example, suppose you had a database consisting of three tables: PART, a table of machine part names and numbers; SUPPLIER, a table of part numbers and their domestic suppliers; and FGN-SUPPLIER, a table of part numbers with foreign suppliers. If you wanted to generate a list of all the parts that had suppliers (either foreign or domestic), you might type the SQL query

```
SELECT PART.NAME
FROM PART,SUPPLIER,FGN-SUPPLIER
WHERE PART.NAME =
SUPPLIER.PART-NUMBER
OR PART.NUMBER = FGN-
SUPPLIER.PART-NUMBER
```

Under normal conditions, this query would work as you might expect. However, if for some reason the FGN-SUPPLIER table were completely empty, the query would still—according to the strict rules of database theory—produce a null result. Why? Because the Cartesian product of the three tables—PART, SUPPLIER, and FGN-SUPPLIER—would have zero rows (the product of the numbers of rows in the three tables). However, because the query optimizers in most commercial products circumvent the step of taking the Cartesian product, they may return a list of parts with domestic suppliers as a result of this query.

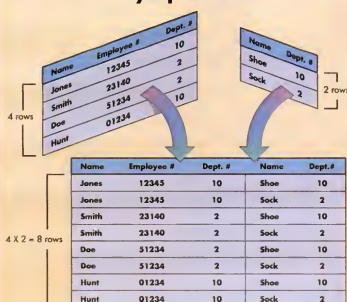
BEWARE THE CLAIMS.

Situations such as these are the most challenging problems facing DBMS designers, who must not only offer competitive performance but also guard against bugs. This is one reason why it pays to make sure your DBMS software is up-to-date: for every new feature in a release, there are bound to be dozens of fixes for subtle problems.

Database query optimization is by no means a cut-and-dried field of knowledge. New performance—and refinement to them—are an area of continuing research both in academia and in the private sector. As a user, you should be wary of vendors' claims that they do more or better optimizations than someone else. As always, it's best to base your evaluations on actual performance—ideally in a situation similar to the one in which the database will be used. □

Contributing editor Brett Glass is a freelance writer based in Palo Alto, California.

Why optimize?



The Cartesian product (otherwise known as the join) of two tables consists of every possible combination of a row from one table and a row from the other. This means the database has to discard the combinations that are wrong, an inefficient process at best. Most DBMS programs avoid taking Cartesian products.

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**INFO
WORLD**

Multiple database servers solve Merrill Lynch woes

Pity the database administrator of 1991. Suddenly, users have begun acquiring powerful query tools, running on personal computers, that provide them virtually transparent access to databases running anywhere in the company. Corporate information is downloaded to a PC LAN-based database server, after which PC users can begin ad hoc querying to their heart's content.

But a number of things stand in these users' way. First of all, the corporate databases may be too large to fit on today's LAN-based database servers. Also, performance may be unacceptable if dozens of users are trying to access a single database server.

For that reason, many companies are deciding to distribute mainframe data across more than one database server. One such company already doing this is Merrill Lynch, whose distributed database architecture, known as Gandolf, even allows for parts of the data to reside on servers made by different vendors, including Oracle and IBM's Database Manager. All Gandolf data can be accessed using a Windows-based front end written by Merrill Lynch, according to Angelo Bobak, assistant vice president of micro technology development at the New York firm.

Gandolf can execute up to 10 queries at once to retrieve data from multiple databases on multiple servers from multiple vendors. Commercial products already capable of doing similar tasks include Gupta Technologies' SQL Windows front end.

The key to making distributed querying work, however, is in splitting the database into logical chunks. Database experts speak of "horizontal table fragmentation" and "vertical table fragmentation." The rub is that the partitioning must be done in a way that gives users the fastest possible answers when querying data. When data is fragmented wrong, the query takes much longer than it would if the data were all on one server.

There are a lot of very technical terms in the database world for this phenomenon, and one very technical one: "thrashing." If the query has to switch back and forth between tables on different nodes of the network in order to perform a join, the query ends up taking a lot longer, and users are unhappy. "It's very tricky to distribute data," Bobak said.

Where Bobak and others are turning to for help are rigorous theories of fragmentation, using algorithms that cluster highest values and lowest values of data in corners of matrices. Once these values are well-defined as "clustered affinity matrices,"

according to the information users typically query, the tables can be split and distributed. An example would be two offices, one of which queries only on records of employees making more than \$50,000 a year, the other on records of employees making less. Such algorithms will probably lead to commercial packages that do the same thing, Bobak said.

The main result of this data splitting for the database administrator is a "nice design spec," outlining just how many servers are needed, as well as the topology of the network needed to service users. Bobak said. Such a spec is a comfort to nontechnical managers who simply want to know how much computing hardware is necessary to downsize. Without such rigor, the effort to deploy distributed data is far less predictable.

Some centralized control must remain, even with a distributed architecture. In this case, all data updates are ultimately made at the mainframe.

A centralized database dictionary must be replicated at each workstation to reflect changes in the database. But such dictionaries, now appearing in products such as DataBase Prism, are necessary to provide users with transparent access to data.

The architecture of Gandolf and other

similar projects is more aimed at getting information out of the corporate database than at the much-harder problem of allowing distributed updates. Other companies, such as K-Mart, are jumping ahead to implement distributed updates first, according to Bruce Scott, cofounder and senior vice president of research and development at Gupta Technologies. Distributed updating requires two-phase commit technology available today in only a few database servers, including SQL Server and Ingres, and in development at Gupta and Oracle, among others.

Other important aspects of distributed queries include using other LAN services, such as mailboxes, to transmit result sets from computer to computer. The phrasing and execution of the query itself can be crucial, and query optimization can still vary widely in the quality of implementation. But large companies are well on the road to deploying distributed querying: Merrill Lynch is already using it on its Toronto trading floor.

For more information on clustered affinity matrices, Bobak recommends a book published last year, *Principles of Distributed Database Systems*, by M. Tamer Ozsu and Patrick Valduriez, published by Prentice-Hall.

CASE STUDY

By Laurie Flynn

Capital Group banks on enterprisewide EIS strategy

If the cliché "time is money" is to be believed, the Capital Group Inc. should be golden.

An enterprisewide strategy for linking the investment professionals in this high-rolling money-management firm to databases of customer data is already reaping benefits for the company. With the ongoing implementation of an executive information system (EIS), these financial experts, with widely varying levels of computer familiarity—as well as patience—are performing the same functions they were before in two-thirds the time.

Based in Los Angeles, the Capital Group is one of the most influential money-management firms in the business, managing \$62 billion in mutual funds, trust accounts, and other investments. With business in Tokyo, London, Geneva, and most major U.S. cities, giving access to the company's databases in the headquarters was no easy proposition.

"One thing we did was an organizational departure—I elected to have the development team in the same building as the [users]. That would allow them to interact with key people," said Jean LeFare, Capital's vice president of technology evaluation. "We depend heavily on prototyping. In most cases, they didn't even know what they needed [until they saw it]."

Capital's EIS is one element in the

company's Portfolio Analysis/Decision Support (PADS) project, which is overseen by LeFare. The project has about 15 dedicated staff and acts as a subset of Capital's 120-person MIS department. The PADS project specifically supports the investment function of the company. For its relatively small number of employees—the investment giant has 1,600 employees worldwide—its strategy for implementing enterprisewide computing systems begets that of a much larger firm. The ratio of employees to PCs is virtually one to one, and most of the PCs are connected on LANs running NetWare. LAN-to-LAN connectivity is achieved using routers from Cisco.

SENDING SQL QUERIES.

The company's client data resides on a Sequant parallel processing system running the Informix database program, and a dozen or so different applications provide varying degrees of access and functionality. The parallel processing system is vital because it guarantees that the company can scale the server to match demand, LeFare said. To give executives the degree of access they require along with a manageable interface, LeFare has selected Informix's Wingz, which, he says, offers him both the connectivity he requires through its DataLink SQL-based software and an easily customized front end. Using a program

written in Wingz' Hyperscript language, DataLink sends an SQL query to the database, which in turn sends the information directly back into the spreadsheet for massaging by the analyst.

When the Capital EIS implementation is complete—which LeFare estimates will occur early next year—the technology will offer substantial flexibility, in addition to savings.

"Eventually, the solution will be a lot cheaper than a typical EIS, which usually uses a mainframe and has a canned way of presenting information," LeFare said.

"This way is more free form." This free-form presentation accommodates for the differences in communicating financial information to all parts of the world. Buying securities in the Far East differs vastly from a bond transaction in Europe, for example, LeFare said.

One of the most important functions of the system is to support alternative definitions of a customer's financial portfolio, which often requires merging several different portfolios. "If they wanted to combine portfolios, they either just didn't, or they did it manually," LeFare said.

An advantage Wingz provides is that in addition to running on PCs it runs on the Mac, a platform preferred by many of the company's money managers. While versions for Windows and OS/2 have been on

the market for some time, the database technology was not incorporated into those programs until last month, making a broader scale implementation at last a reality, LeFare said.

Training makes full-scale implementation of the EIS a slower prospect. Because many of its users are executive-level employees and because of complicated travel schedules, one-on-one training is imperative.

TIP OF THE ICEBERG.

Capital's EIS is only one part of the company's enterprisewide strategy: the PADS project is another. A videoconferencing system has been implemented between the company's New York and Los Angeles offices, and a full-scale implementation linking offices worldwide is in the offing. LeFare sees it as way to cut down intercontinental travel. "Not just to save costs, but because [too much travel] can take a few years off the lives of our key people," LeFare said.

In the meantime, Capital will continue to acquire new technologies and implement them according to the needs of its key people; its investment professionals.

"They're entitled to whatever technology they like," LeFare said. "We accommodate individual choice. Their workstations are an extension of themselves."

By Alice LaPlante

Survival skills for the corporate PC manager

As the corporate computing world rushes to embrace the PC as a legitimate hardware platform for enterprise-wide computing, the role of the PC manager changes significantly.

Indeed, the single "PC manager" no longer exists for most Fortune 1000 corporations. Instead, PC-savvy members of the IS staff play increasingly diverse — yet important — roles in formulating and implementing a corporate-wide computing strategy. In these roles, they have a decided advantage over their mainframe-oriented counterparts from the traditional MIS world, thanks to the enhanced power and cost effectiveness of the desktop environment.

Still, professionals formerly in charge of stand-alone PCs, who have spent their time evaluating new hardware and software, providing end-user training, and staffing the help desk, say there are some major challenges to moving into a networked, enterprise-wide computing environment.

Now, they must worry about corporate-wide IS concerns such as security, data integrity, and information flow; understand mainframe and minicomputer technology well enough to discriminate between those applications that still need larger systems and those appropriate for a PC or workstation; comprehend the myriad connectivity issues involved in hooking machines from diverse vendors as well as sophisticated networks that can literally span the globe; grasp the business and end-user requirements of the corporation as a whole to get the "big picture"; and design sophisticated, enterprise-wide applications that solve real business problems.

The net result? PC managers must break new ground in determining where their skills will take them in the corporate IS world of the '90s and beyond.

"What we have is a transition in the making," said Priscilla Tate-Austin, execu-

tive director of the New York-based Micro Managers Association (MMA). Tate-Austin has watched the members of her organization develop promising career paths based on their PC skills — held in ever growing esteem.

Within the MIS mainframe world there were always a multitude of specialties, Tate-Austin said. Those specialties include data entry supervisors; project leaders; programmer/analysts; and maintenance technicians, to name just a few. But it is only recently that systems professionals in the microcomputer world have begun to divide into such categories.

One of the main goals of the MMA over the years has been to help PC managers with career development — not always an easy task because the upward path for a PC professional has never been patently obvious, Tate-Austin said.

"The forging of jobs and careers are two separate things, and the job market needs to understand that," said Tate-Austin, adding that the former job of "PC generalist" has all but disappeared. And, she said, although many of the low-end PC manager jobs — those involving training and support, for example — have been well defined, the higher level jobs pertaining to strategic direction and enterprise application design are just now being claimed by PC professionals.

One example of an area of specialization formerly confined to the mainframe world, but rapidly coming into its own in the microcomputer universe: the job of managing vendor relations. "This always existed in the mainframe world, but now it's becoming a separate function in the PC world as well," Tate-Austin said. Dealing with hardware and software vendors has always been an integral part of a PC manager's job, whether it be getting evaluation units of new products, negotiating volume discounts and site licenses, or forging a close relationship in order to receive adequate support levels. Now these vendor tasks have become so complicated and time consuming, they require dedicated people — just like in the mainframe world, Tate-Austin said.

SPECIALIZATION IS THE KEY.

Julian Horwich, director of the Corporate Association of Microcomputer Professionals (CAMP), based in Chicago, has seen the high degree of specialization reflected by attendance at his organization's meetings.

"People who used to come to all our events — over 20 annually — now come to four or five, depending on what their area of interest is," Horwich said. He added that since his organization still has as members a number of "generalists," the challenge is to offer programs that fit both the generalists and the specialists, as well as the mostly varying amounts of expertise within a particular topic.

"Some people go very deep into a particular topic; others just want to skim the surface," he said, adding that PC managers were "easier to satisfy" five years ago, when people were mostly concerned about choosing the right spreadsheet or word processor. "Now I have a high amount of interest in MIS development and connectivity, and people want a much deeper and more sophisticated understanding of those topics," Horwich said.

The reason for this? The coming-of-age



At Matsui & Co. Inc., Bob Martinich says a cross-over of interests between MIS and PC professionals benefits the company as a whole.

of the PC via downsizing, or the moving of mainframe-based applications onto distributed linked workstations or LANs.

"Last year I put together a session on SQL servers that got a good-sized audience, but this year I haven't seen the flyers out for our July meeting on SQL servers, and I have people calling up and making reservations," said Horwich, adding that the cost savings to put a major application onto a LAN are tremendously attractive for many firms. At CAMP's recent biannual Spring Vendor Fair, a survey of attendees showed that a full third of all PCs represented were now hooked into LANs — a substantial increase over previous estimates, said Horwich.

STILL SOME TENSION.

But in many organizations, there is still tension between the old-style MIS workers, and the PC manager, despite — or perhaps because of — the increased importance of the PC.

"It's still very much us vs. them," said Dick Aiken, the microcomputer specialist at GE Armaments Division, in Burlington, Vermont, which is replacing the terminals on users' desks with networked PCs — but not without a lot of resistance from the MIS mainframe staff.

"They look at me as though I'm the outlaw. Going from terminals to PCs has been enormously threatening to them," Aiken said, who feels, however, that their fears are not justified. "Changing over to PCs isn't going to eliminate their jobs, just change them," he said.

The LAN currently being installed — the first one for this site — is a joint effort between the PC people and the MIS large systems and networking staff. Cooperation

is critical because neither has all the knowledge to pull it off alone, Aiken said. The project has caused Aiken to delve into technologies he formerly had only an awareness of.

"I'm reading hard on different kinds of links, and protocols: X.25, X.400," he said. "We're also considering FDDI, which really opens a whole new bag of tricks for me to learn."

Aiken said his job has changed significantly in recent years. "In the old days it was all handholding; telling users where the ESC key was and how to boot up Lotus," Aiken said. "Now the emphasis has switched to broader, more strategic issues."

The fact that lean times have caused GE to trim its systems support staff hasn't helped. "We used to have more people to do less work," Aiken said.

As far as diplomatic skills are concerned, Aiken feels that after putting in this enterprise-wide network, he will be "ready to go to the United Nations" — he is getting so skilled at working with all the different groups of people necessary to implement the project.

"For example, I needed to link together some PCs using our Ethernet backbone, but our mainframe communications people said they couldn't drop a line for several weeks. In the meantime, I had users screaming to get onto the network. I've had to use my interpersonal skills to the utmost."

Aiken's job duties now go all the way up from "micro management up to macro management and strategic planning," Aiken said, adding that because of his knowledge of PC technology and the industry, GE management is giving him a hand in strategic planning — particularly for some

Surviving in the enterprise age

For PC professionals, the challenges of moving into an enterprise-wide computing environment are many. To adapt they must:

- Address corporatewide IS concerns such as security, data integrity, and information flow.
- Understand mainframe and minicomputer technology to discriminate between the applications that still need larger systems and those appropriate for a PC.
- Comprehend the connectivity issues involved in hooking machines from diverse vendors as well as sophisticated wide area networks.
- Grasp the business and end-user requirements of the corporation as a whole, well enough to get the "big picture."

potential downsizing projects approaching. "I have knowledge and contacts in the industry that obviously are not developed by the other MIS people," he said.

A BLURRING OF DISTINCTIONS.

Luckily, for many companies, the "turf battles" haven't been nearly as severe. Instead, a blurring of distinction and responsibilities has caused MIS and PC staffs to work together in harmony — and to teach each other valuable skills for the environment that is new to both camps.

This is the case at Kendall Healthcare Products Co., where the PC people have traditionally been separated from the mainframe MIS group, according to Roy Wilsker, manager of end-user services at the Mansfield, Massachusetts, company. "Many of the people in the mainframe environment are showing more and more interest in PCs, which we are encouraging," he said. "Our feeling is, you can't put everything on the mainframe, and you can't put everything on the PC, and the more people who are aware of the mutual capabilities of both, the better."

Kendall is now taking a look at downsizing certain applications — a project that would require close collaboration between the MIS group, the PC group, and the end-user department for whom the application will be written.

For companies such as Kendall Healthcare, where the various end-user departments play very involved, hands-on roles in PC-based systems, Wilsker sees a staff such as his acting as a facilitator rather than as implementer.

"We'll be midwives to the process, acting as consultants who help the various end-user departments figure out, plan, and implement systems and then run them in a secure environment," Wilsker said.

For PC-oriented staff, there is a lot to learn about critical, corporate-wide IS concerns — formerly handled by MIS — that now have to be handled at a lower organization level, due to the proliferation of LANs. A key concern: data security and integrity.

"There are still things that need to be done to protect the company, such as make sure that critical information is secure and backed up," said Wilsker, who added that managers must also make sure more than one person understands a particular system. CAMP's Horwich sees a distinction between those PC managers who primarily worked in office automation areas — choosing and supporting off-the-shelf applications for end-users — and those involved in traditional MIS development work.

MIS people have been trained on such

key issues as data integrity, performance monitoring, and coordinating large groups of developers, whereas office automation people have been focused on building a solid platform for end-users, choosing the right hardware and software products, and training and support issues, Horwich said.

During the past two to three years, Horwich has seen MIS developers, accustomed to working on mainframe and minicomputers but now having to develop

on PCs and workstations, grappling with such issues as PC interrupts, channels, and GUI interfaces. PC managers from the office automation side, on the other hand, are confronted with complex connectivity issues, increasingly sophisticated operating environments such as OS/2, and enterprise-wide security issues.

Increasingly, therefore, Horwich sees a cross-pollination of interests and ideas — something essential if a coherent, corpo-

ratewide computing strategy is to be realized.

"Not only do you have to talk to traditional MIS types, but to a different set of vendors and make technology decisions that are in a whole new area," agreed Bob Martinez, manager of end-user computing and networks at Matsui & Co. Inc., in New York. For example, Martinez has moved beyond LANs into WANs [wide area networking], for which he has had to learn

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CAMP director Julian Horwich says he sees PC managers in his organization becoming more specialized.

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about such things as T1, bridges, and routers. "It's a fairly steep learning curve," he admitted. "Hooking together departmental LANs is straightforward and easy; wide area networking is much harder."

Regarding differences between MIS and PC people, Martinez believes that the differences have "been more superficial than substantial." He says at his organization there has been a lot of interest in cross-over skills between the various platforms

— something that benefits the company as a whole.

"MIS people aren't as closed to PC technology as has been reported," Martinez said. "On the contrary, they are eager to get into this."

"I honestly think in some ways it's easier for a mainframe person to make a switch to PCs than the other way around," Martinez said. "They understand such things as data security and integrity, data

redundancy, and other issues that have never existed in the PC world up to now."

On the other hand, PC managers have the advantage of having always been closer to the end-user, said Martinez and others.

"Most PC people think in terms of immediate business needs," Martinez said.

"MIS has tended to have too much of a technical top-down approach, without focusing on business needs. Sometimes they come up with systems that are the

equivalent of a high-speed rail link between New York and Akron: It might be elegant and fast, but who needs it?"

KEYS TO THE KINGDOM.

Indeed, the fact that many IS organizations are trying to get closer to the business needs of their companies, as well as the increasing power of the PC, means that PC managers are in a good position. Since PC managers have always been closer to end-users than their MIS counterparts, they have a decided advantage now that more power is being put into users' hands.

"Clearly, the microprocessor has inherited the keys to the kingdom," said the MMA's Tate-Austin. "Whether it is an information center, or an applications development group, or in data architecture, this is clearly the platform that will dominate."

As a result, the PC manager is in an "excellent position" to move out into the systems limelight, said Tate-Austin and others.

One big change: The term "IS" is fast replacing "MIS" as the word used to describe the function of corporate computing. Not only does this take away the sting from the formerly bad reputation MIS had of not responding to users adequately, but it now encompasses literally all aspects — including the heavy involvement of end-users — in the corporate computing environment.

Moreover, many organizations are increasingly experimenting with different ways of structuring their systems departments, decentralizing certain functions in order to put them closer to the end-user, and to be more responsive to the business.

"More and more, 'information center' is a bad word. 'Data center' is a bad word. Anything with 'center' in it generally doesn't bode well," Tate-Austin said. "The world is changing."

For the PC manager as the traditional trainer and supporter of the end-user, this is both good and not so good news. The down side: Because the microcomputer is now part of the enterprise environment, the PC manager can't always deliver the goods — it is no longer in his or her power.

"The buck stops here, which can put you between a rock and a hard place when things are no longer completely in your control," said GE's Aiken. Still, this rapport with the end-user could well be one of the PC manager's biggest strengths, said Aiken and others.

"Anyone who doesn't constantly talk to end-users is not being fully effective," Martinez said. Joe Sasso, assistant vice president of the advanced technology group at Barclays Bank, in New York agreed: "In many companies, end-user departments are literally taking ownership of computing, and systems are rapidly becoming a profit-and-loss item in many firms' departmental budgets. As a result, business skills are essential for IS workers."

But the biggest challenge for PC managers remains constant: understanding. Although the responsibilities and scope of the job has expanded dramatically, resources in most companies have not.

"Technical demands have increased, the number of users have increased, but staffs have not grown in proportion," said CAMP's Horwich. "As a result, it becomes very difficult to get everything done and be home by 6 p.m. As a result, time continues to be the biggest challenge." □

Alice LaPlante is a freelance writer based in Palo Alto, California.

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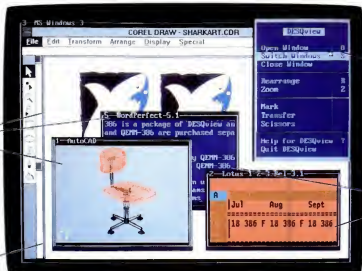
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REVIEWS

After the release of the buggy, much-maligned MS-DOS 4.0, Microsoft devoted its operating system marketing and development muscle to OS/2, DOS-based Windows 3.0 surprised even Microsoft by leaving OS/2 in the dust, and Windows quickly showed signs that it required a sturdier, more memory-efficient foundation than DOS 3.3 or DOS 4.0. At the same time, Digital Research Inc. challenged Microsoft's DOS stranglehold by introducing DR DOS 5.0. (See review, May 27, page 91.) Motivated by these new developments, Microsoft dusted off its DOS tools and began work on MS-DOS 5.0.

After months of anticipation and the largest beta-test program in history, DOS 5.0 is ready for prime time. Leaner, meaner, and more feature-rich than ever, it shows that reports of DOS's demise have been greatly exaggerated.

FEATURES:

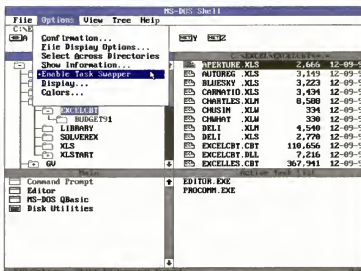
Many of MS-DOS 5.0's new features have likely been inspired by DR DOS 5.0. As with DR DOS, MS-DOS 5.0 adds advanced memory management, an enhanced graphic shell, 2-gigabyte disk capacity, a welcome full-screen editor, a command history utility, a new version of the Smartdrive disk cache. In addition, there is a new Basic interpreter, a task swapper, and an undelete utility. Microsoft also promises a "ROM-able" version with power-saving management (for laptops) and a file transfer program.

Command enhancements: Similar to DR DOS, MS-DOS 5.0 includes on-line help, available from both command line and shell. Unlike DR DOS, which can only help you with external commands (commands that have their own COM or EXE files), MS-DOS offers help on any command—internal or external. This is a great improvement, because internal commands—the ones built into COMMAND.COM—are far more commonly used than external commands. Also, if you type "help" at the DOS prompt, you get a list of DOS commands.

MS-DOS 5.0 adds many small, but useful, enhancements to the familiar DOS commands. The COMP command now compares text files better, showing differences between two files as ASCII characters as well as hexadecimal numbers, and giving the line numbers where differences occur. The directory, DIR, can sort files by date, time, size, name, and/or extension. It can also show hidden, system, and read-only files, as well as scan the entire disk. DIRBG still gives users a primitive, but effective, way to patch files and enter programs from magazines. EDLIN is still included for compatibility. FIND can be made case-insensitive, simplifying word searches.

MS-DOS 5.0's FORMAT adds several new features. In default mode, FORMAT checks a disk to see if it has been previously formatted. If it has, DOS performs a "safe" format, clearing the file allocation table and root directory but saving the contents elsewhere, without deleting any data. The UNFORMAT command can reverse a safe format.

The MEM command can now list the system's TSRs and drivers and show



The MS-DOS Shell lets users view the directories and files of one or two drives. The Task Swapper allows switching among active programs, without closing applications.

MS-DOS 5: Reigning OS improves its value

Feature-rich upgrade boosts program space; offers graphic shell, task swapping, QBasic.

By BRETT GLASS, CONTRIBUTING EDITOR

which are loaded into lower (0K to 640K) and upper (640K to 1 megabyte, also known as UMB) memory. MEM can also tell you whether MS-DOS is loaded into high memory and report how much XMS and extended memory are available.

New commands: MS-DOS 5.0 doesn't add equivalents for all the new commands in DR DOS 5.0, but it does have some useful new features. The three most useful new programs are UNDELETE, UNFORMAT, and MIRROR (primarily used by other utilities), which Microsoft licensed from Central Point Software. These help you recover the contents of deleted files and reformatted disks.

The most eye-catching new addition is

QBasic, a subset of Microsoft's Quick-Basic language, which makes GW-BASIC appear archaic in comparison. A threaded, interpreted language, QBasic checks your program's syntax as you edit it and allows you to debug programs by setting breakpoints and stepping through your program. However, Microsoft isn't exactly giving away QuickBasic. QBasic is an interpreter only; it can't compile a program nor make an executable file. Although it can run a Basic program from the command line, QBasic displays its menu-based interface for a split second before the program begins. This quick reduces QBasic's value for writing utilities, but users will undoubtedly find it

useful for learning Basic. Many may even take the bait and move up to the Quick-Basic compiler.

MS-DOS 5.0's screen editor, EDIT, is the same editor that's included with QuickBasic. This editor's command set is a minimal CUA editor that forces you to cut and paste instead of marking and moving blocks of text, which makes editing without a mouse awkward. Nonetheless, EDIT makes editing batch files easy (and you can forget EDLIN).

DOSKEY, a TSR, provides command history and a primitive macro facility. The history keeps by default about a screen's worth of commands, though you can change the buffer size. It uses the usual DOS editing keys, including control-arrow combinations for moving about by word. There is also a search function for commands. The macros run quickly from RAM, allow more than one command per line, and can supersede DOS internal commands; however, they're limited to 127 characters. You

REPORT CARD INFO

SINGLE-TASKING OPERATING SYSTEM
MS-DOS
VERSION 5.0

Criterion	(Weighting)	Score
Performance		
Memory handling	(150)	Good
User interface	(75)	Very Good
Speed	(125)	Very Good
Compatibility	(150)	Very Good
Documentation	(50)	Very Good
Setup	(75)	Very Good
Ease of learning	(50)	Very Good
Ease of use	(100)	Good
Error handling	(125)	Satisfactory
Support		
Support policies	(50)	Satisfactory
Technical support	(75)	Poor
Value	(75)	Excellent
Final score		6.8

PRODUCT SUMMARY

Company: Microsoft Corp., 1 Microsoft Way, Redmond, WA 98052; (800) 992-DOS5, (206) 882-8080, fax: (206) 883-8101.

List Price: \$99.
Requires: Intel 8088 or compatible; MS-DOS 2.11 or later; 256K of RAM (512K recommended); mouse optional.

Pros: Improved memory management; interface; numerous command enhancements; screen editor; command-line help; undelete utility; task swapper; QBasic; low price.

Cons: Support hard to reach; must upgrade some software or use SETVER.
Summary: A great leap forward for the standard PC operating system.

INSIDE REVIEWS

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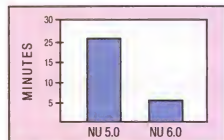
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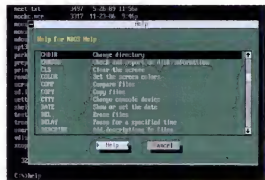
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SYMANTEC.

type their names at the beginning of a command line to invoke them.

PERFORMANCE:

Memory handling: Perhaps the most urgent plea from DOS users — and especially Windows users — was to increase the amount of memory available to applications. As with DR DOS, MS-DOS 5 can free space for other programs by loading itself into the High Memory Area (HMA), the 64K of RAM just above 1 megabyte. However, unlike DR DOS, MS-DOS 5 doesn't have the flexibility to load itself between 640K and 1 megabyte, which may cause compatibility problems with a few programs, such as DESQview. (Microsoft intended to keep the UMB free for TSRs and device drivers.)

MS-DOS 5.0 comes with two memory managers: HIMEM.SYS, which implements the Extended Memory Standard (XMS), and EMM386.EXE, which implements LIM/EMS 4.0, but only on a 386 or 486 machine. These two drivers are newer versions than those that came with Windows 3.0. HIMEM.SYS is sufficient to allow DOS 5.0 to load itself into high memory, but EMM386.EXE or some other LIM/EMS 4.0 driver is required to allow DOS 5.0 to load drivers and TSRs into upper memory with the "devicehigh" and "loadhigh" commands.

MS-DOS 5.0's memory managers have both strong and weak points relative to those of DR DOS. MS-DOS 5.0 does contain a counterpart to DR DOS's HIDEOS.SYS, which lets 286-based systems with Leap and Neat chips set load TSRs and drivers into upper memory. EMM386.EXE will work with Windows 3.0 in 386 enhanced mode, but DR DOS's EMM386.SYS will not. And neither operating system is as powerful as such third-party memory managers as OEMM, which can optimize the layout of upper memory and run Windows in standard mode. Some of Microsoft's support team recommended using OEMM with MS-DOS 5.0 and Windows 3.0.

MS-DOS 5.0 yields approximately 615K to 620K of usable program space on many machines, but lacks the capability to load DOS into upper memory (below 1 megabyte), a 386 memory manager that supports optimization and Windows' standard mode, and a utility that takes advantage of 286 chip sets. We rate memory handling good.

User interface: MS-DOS Shell, MS-DOS 5.0's menu-driven user interface, can work equally well in either graphics mode or text mode, unlike DR DOS's ViewMax, which must operate in graphics mode. DOS Shell is Microsoft Windows' File Manager done right. It's fast, easy to use, and lets you find what you need without much hunting. The included task swapper allows you to toggle back and forth between active programs, swapping them to and from disk automatically. Task swapping is relatively slow; it does not swap to EMS memory as some programs do, though you can set up a RAM drive. Responses within the shell were snappy, and the menus were clear and concise.

We encountered one small bug in the task swapper. When we changed from a

Compatibility: We had no problems running our test suite nor NetWare, but our informal experimentation found a few programs that weren't ready to run under MS-DOS 5.0. If an application insists on using an earlier version of DOS, you may want to try SETVER, which tells MS-DOS to lie to the application about DOS's version number. However, as you configure SETVER, you'll see a message and disclaimer: "You may lose or corrupt data, or cause system instabilities. In that circumstance, Microsoft is not responsible for any loss or damage." The chances of this occurring are probably quite small; however, it can't hurt to call your application vendor to get an update or make sure the program has been tried with DOS 5.0.

Because MS-DOS is the standard, it will not be long before all vendors and

ly, Microsoft warns that booting with an older version of DOS after installing MS-DOS 5.0 can possibly damage the information on your hard disk, especially in the case of drives with large sectors.

SETUP ran flawlessly for us on several machines, and the capability to uninstall DOS and return to your older version is comforting. If you find an incompatibility or just decide you've seen enough, booting off the uninstall disk you made during setup returns your system to its previous state.

MS-DOS 5.0 modifies your system's boot sector as it installs itself, which may be ill for other operating systems such as Unix, that share the disk with it.

If you're running a network, chances are you'll need to change drivers. MS-DOS 5.0 includes drivers for NetWare and LAN Manager variations.

Some programs, such as Power Cache Plus, refuse to load, even though they work fine during SETUP.

One possible problem area is that the retail version of MS-DOS 5.0 is sold as an upgrade only, i.e., there's no bootable disk included in the package. (OEMs will offer MS-DOS 5.0 installed on their machines, with a bootable disk.)

Not having a bootable disk can also be a problem if your hard disk isn't working or is infected with a virus and you need to boot from an original, clean DOS disk. (SETUP does prompt you to create a DOS 5.0 system disk to cover this, but it's not as secure as a factory-made product.)

Apart from the lack of a clean bootable disk, there are no troubles with setup, the built-in disk backup and uninstall capabilities are a boon. We rate setup very good.

EASE OF LEARNING:

MS-DOS 5.0 follows in DR DOS' footsteps, providing even better on-line help for the command-line user and similar help in its graphical shell. Because MS-DOS 5.0 help supports internal commands, Microsoft has more than caught up to Digital Research in this category. We rate ease of learning very good.

EASE OF USE:

Version 5.0 is easier to use than earlier versions, with a better graphic shell, history facility, and full-screen editor. However, it still lacks a few of the enhanced commands present in DR DOS, such as

"DOS Shell is Microsoft Windows' File Manager done right. It's fast, easy to use, and lets you find what you need without much hunting."

text editor running in 50-line mode to a DOS prompt running in 25-line mode, the text cursor would begin to appear as a horizontal line in the middle of the character cell, rather than at the bottom.

The many positive points earn a very good score for interface.

Speed: We tested MS-DOS 5.0 with the same applications-based test suite we use to evaluate CPUs; we used both an AST Bravo (8-MHz 286) and a Compaq Deskpro 386/20 to compare 286 and 386 performance. (See table for times and test programs.)

On the AST Bravo, MS-DOS 5.0 was as quick as or slightly faster than DR DOS. MS-DOS 5.0 was better in multitasking, AutoCAD, and dBase III Plus. On the Compaq, MS-DOS 5.0 finished ahead of DR DOS in most categories, including CPU- and disk-intensive, and multitasking times. (MS-DOS 5.0 was very close in speed tests to Versions 3.3 and 4.01, as well.)

The superior performance on the 386 gives MS-DOS 5.0 the edge in this category; we rate speed very good.

software products support 5.0. But until that time, be aware that you may have some minor compatibility problems to solve. We rate compatibility very good.

DOCUMENTATION:

MS-DOS 5.0 comes with two manuals: a user's guide and reference and a getting started manual. The user's guide is referenced extensively and contains several how-to chapters to supplement the rather terse command reference. There's also an example for every command. However, the package does not contain a quick-reference card, as DR DOS does. We rate documentation very good.

SETUP:

The Microsoft Getting Started manual offers several warnings before you install MS-DOS 5.0. All TSRs, including the network, must be removed from the system before SETUP will run. MS-DOS 5.0 might rearrange your hard drive letters, requiring you to rewrite batch files and reconfigure software. (MS-DOS 5.0 insists on making your first hard drive C.) Final-

APPLICATIONS TESTS

Operating Systems

(test times in hours:minutes:seconds)

	AST Bravo 286/8				Compaq Deskpro 386/20e			
	MS-DOS 5.0	DR DOS 5.0	MS-DOS 3.3	MS-DOS 4.01	MS-DOS 5.0	DR DOS 5.0	Compaq DOS 3.31	MS-DOS 3.3
CPU-intensive	1:45:23	1:45:47	1:45:03	1:47:45	0:30:34	0:31:28	0:30:24	0:30:27
Disk-intensive	1:30:01	1:33:04	1:29:48	1:24:13	0:44:41	0:45:36	0:44:28	0:45:49
Multitasking (Windows)	0:08:32	0:08:48	0:08:36	0:08:34	0:03:13	0:03:32	0:03:19	0:03:21
AutoCAD, Release 10	0:16:24	0:16:44	0:16:10	0:18:46	0:06:16	0:05:18	0:05:06	0:05:08
dBase III Plus 1.1	0:49:06	0:52:01	0:49:16	0:46:09	0:24:01	0:24:56	0:24:03	0:24:44
dBase IV 1.0	0:24:26	0:24:30	0:24:10	0:22:24	0:10:15	0:10:01	0:09:44	0:10:07
Lotus 1-2-3, Release 2.2	0:28:57	0:29:01	0:28:55	0:28:57	0:09:35	0:10:03	0:09:17	0:09:17
Lotus 1-2-3, Release 3.0	0:57:09	0:57:07	0:57:06	0:57:09	0:13:23	0:14:45	0:14:42	0:14:43
Paradox 386	0:16:29	0:16:33	0:16:22	0:15:40	0:10:25	0:10:39	0:10:41	0:10:58
WordPerfect 5.0	0:02:53	0:02:55	0:02:52	0:02:53	0:01:20	0:01:22	0:01:19	0:01:19

* DR DOS 5.0 reviewed May 27, Page 91.

Our applications suite of common business programs tests different aspects of system performance, including video (AutoCAD), expanded memory (Lotus 1-2-3, Release 2.2), extended memory (Lotus 1-2-3, Release 3.0), and 32-bit operation (Paradox). If you plan to buy a machine for a specific application, you should compare times for that program. Lower numbers indicate better performance.

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Signature _____ Day phone (____) _____

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Total:	

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recursive file deletion, and both still omit such vital operations from the command line as "move file" and "rename directory." We rate ease of use good.

ERROR HANDLING:

MS-DOS 5.0 handles critical errors just as it always has — unless the application traps the error, you're presented with a cryptic message followed by a prompt such as "Abort, Retry, Fail?" MS-DOS 5.0's command parser returns more precise error messages than earlier versions; however, they are still terse, and we couldn't find a list of error messages and their explanations in the documentation. We rate error handling satisfactory.

SUPPORT:

Support policies: Microsoft has a 24-hour automated support line that offers a choice of recorded messages about MS-DOS 5.0 and some useful information. For purchasers of the retail upgrade, in the first 90 days you're entitled to free (but not toll-free) support, from 8 a.m. to 6 p.m. Pacific time. After 90 days, you must call a 900 number for support, available for anyone, even OEM customers. There is also a CompuServe forum. We rate support policies satisfactory.

MS-DOS 5.0 now offers considerably more functionality than previous versions.

Technical support: We got through to the automated recordings easily, but the "live" support number was as busy as a radio contest line. Over a period of several days we received numerous busy signals and spent some long periods on hold. The popularity of the product is obviously taxing Microsoft, which hired an additional 100 technicians to handle the calls. (We found the best support on CompuServe's MSDOS forum.) Though we've received better support in the past and we expect it again in future, due to busy signals and long periods on hold technical support rates poor.

VALUE:

The MS-DOS 5.0 Upgrade lists for \$99.95. (We've seen upgrade kits on sale for as little as \$39.95.) The MS-DOS Upgrade License Pack costs \$79.95 per computer, and the "100% Program" offers several price tiers: \$59 each to upgrade 100 to 999 units, \$44 for 1,000 to 4,999, and \$37 for 5,000 or more units. Resellers, e.g., Egghead, will offer separate group-upgrade prices.

Both MS-DOS 5.0 and DR DOS 5 (\$199) are fine products and considerable improvements over past versions; we hope to see still better products emerge.

MS-DOS 5.0 has a few quirks, but now it offers far more functionality than previous versions. We rate it excellent in value.

Brett Glass was one of the original architects of the IEEE 802.11 Token Ring LAN and currently hosts the OS/2 conference on the Well. He can be reached electronically at [7267.3673] on CompuServe, "glass" on BIX, and rogue@well.sf.ca.us on Usenet and the Arpa Internet.

NetWare 2.2 takes aim at smaller LANs

Upgrade makes networking easier for part-time network managers.

BY TRACEY CAPEN

ADDITIONAL REVIEWS EDITOR

NetWare, Version 2.2, Novell's most recent release of its flagship network operating system, is less a new product than a consolidation of the Version 2.15 line. Version 2.2 adds a few new features, but for the most part combines the security features of Advanced and SFT (System Fault Tolerant) NetWare with the less complicated installation of ELS (Entry Level Solution) NetWare Levels I and II. NetWare 2.2 also adds a number of utilities that first appeared in Novell's 32-bit operating system, NetWare 386 (now called NetWare v3.11).

With NetWare 3.11 covering large networks and enterprise-wide computing environments, NetWare 2.2 focuses on small- and medium-size LANs that may not have full-time administrators.

We evaluated NetWare 2.2 on our network operating system test plan. (See product comparison, February 11, page 55.)

FEATURES:

NetWare 2.2's most obvious change is its improved ease of installation and use. Novell has done away with Version 2.15's complicated NETGEN in favor of a more standard Install application. This new utility gives easy-to-understand options for installing, upgrading, or modifying NetWare 2.2.

Once the server's installed, another new utility, NWSETUP, lets you type in a quick list of users. When the list is complete, NetWare automatically sets up basic user accounts, user directories, and starting passwords.

Other NetWare features have been changed for easier installation. A simpler WGEN replaces SIZER for creating workstation network drivers, and ROUTEMAN makes it easier to create internal or external routes.

Novell's external bridges (for connecting two or more networks) are now called routers and can be run in dedicated protected mode. This gives better performance when running multiple Value Added Processes (VAPs) to run in an external router.

Novell has changed NetWare 2.2's memory configuration. Networks running several VAPs or large hard disks could, in previous versions, run out of File Service Processes (FSPs), producing a significant drop in performance. In Version 2.2, Novell has added a fourth memory pool for NetWare's directory handlers, giving the operating system more FSPs.

NetWare 2.2's core printing services are no longer built in but is now a separate linkable (for running as a VAP) or executable application. It can be run on a separate, dedicated print server or on a workstation. Print queue polling is now user adjustable, which can result in better print performance.

With Version 2.2, NetWare no longer includes NetWare Message Handling Service (MHS), which is used as the backend transport system by some third-party applications, such as E-mail.

However, an updated version of



NetWare 2.2's NWSETUP lets network administrators create a quick list of new users. The utility then gives each user a directory, basic rights, and a starting password.

Novell's Mac VAP — NetWare for Macintosh, Version 2.2 — is bundled with Version 2.2. This release has somewhat better Macintosh administration and supports AppleTalk Phase II.

PERFORMANCE:

Speed: There are major changes in Version 2.2 specifically designed to boost performance, according to Novell. However, users who are pushing the limits of the available file service processes (FSP) are likely to see better speed due to Version 2.2's more efficient memory utilization.

In our 24-station network tests, NetWare 2.2 was considerably faster than Advanced NetWare, Version 2.15c. Version 2.2 completed our business application-based office test in 1:46 minutes — 34 percent faster than the previous release. Version 2.2 is also 6 percent faster than NetWare 3.1.

Running our Paradox 3.0 transaction test with 24 stations, Version 2.2 was 17 percent faster — 2.67 transactions per minute vs. 2.22 transactions per minute — than Version 2.15.

NetWare 2.2 had surprisingly little performance drop between 12 and 24 stations, unlike Version 2.15c. (For a more detailed description of how we test network operating system speed, see "How We Test" in our LAN product comparison, February 11, page 60.)

Based on its greatly improved speed, we rate NetWare 2.2's very good.

Flexibility/compatibility: NetWare 2.2 servers require an 80286 or higher DOS-compatible PC with at least 2½ megabytes of RAM. You will need at least 4 megabytes of RAM if VAPs are installed. NetWare's system files and utilities take up approximately 10 megabytes of hard disk space.

NetWare workstation requirements are unchanged. You can use an IBM PC, PS/2, CP compatible, or Macintosh. The IPX network protocol drivers take up comparatively little RAM — only about 70K. RAM overhead can be cut further

by loading most of the shell into extended or expanded memory.

NetWare 2.2 uses the same IPX and NETX workstation drivers as Version 2.15. Nearly all VAPs are network interface card drivers designed for Version 2.15 should be compatible with Version 2.2, according to Novell. In addition, boot PROMs used in diskless workstations should also be compatible. Although a NETS driver is currently not included with NetWare 2.2, it is bundled with MS-DOS 5.0.

Flexibility/compatibility earns excellent.

Security: Access to NetWare 2.2 is controlled by passwords on individual accounts. User rights have been updated to match Version 3.11 and are backward compatible with Version 2.15. NetWare 2.2 encrypts passwords at the server and over the wire as well. The administrator can assign expiration dates to passwords, as well as a minimum size. NetWare also keeps detailed audit files, recording a chronological list of log ins and log outs, as well as a list of each user's account balance. We rate security very good.

DOCUMENTATION:

For Version 2.2, Novell has condensed, reorganized, and streamlined NetWare's voluminous documentation. The three-ring binders have been replaced by bound books that take up less shelf space but still manage to stay open when placed on your desk.

A small, getting-started installation booklet gives a quick overview of LANs, lists the hardware needed for file servers and workstations, and briefly describes how to install NetWare. The book is clearly designed to help inexperienced NetWare users build a simple network, without overwhelming them with details.

Two large reference books cover advanced installation options, network maintenance, NetWare commands, and utilities. A new spiral-bound *Quick Access Guide* gives administrators a fast way to look up commonly used network

maintenance options, such as adding new users, defining access rights, changing log-in scripts, and controlling printing.

During installation, on-line help gives short descriptions of menu options. Once NetWare is running, a more extensive, Folio Views-based on-line help gives longer descriptions of the operating system's commands and utilities. We rate documentation excellent.

SETUP:

NetWare 2.2 is faster and easier to install than NetWare 2.15. The software is now shipped on 16 high-density disks, instead of the previous version's 44 360K floppies; 3½-inch disks are also available.

The installation starts with four menu options. The first, advanced installation, modifies the existing Version 2.2 installation, or upgrade from an earlier version of NetWare.

The basic setup is ideal for non-technical users. NetWare requests only the minimum information needed to start the server. The requests include whether the server will be a dedicated or non-dedicated server, the network interface card type, and a server name.

However, what you gain in ease of setup, you may lose in performance. To keep setup simple, the installation process selects default values that represent an average server environment. The basic installation also assumes the network interface cards are in their default configuration. If there are other adapter cards in the system, there is a greater possibility of conflicts than with the advanced configuration.

The advanced setup is better suited for experienced NetWare installers. Advanced setup lets you fine-tune the server with a longer list of configuration options. For example, you can configure multiple network interface cards and drivers, and automatically install the NetWare for Macintosh VAP.

NetWare 2.2's pricing makes it a better value for smaller networks — up to 50 users — than the ELS, Advanced, and SFT versions it replaces.

As with NetWare 3.11, Version 2.2 has dumped the mandatory computer, which is now an option. You no longer have to wait hours while NetWare checks the entire hard disk surface. Version 2.2 does a quick test of the drive's zero track and then continues with the setup. Better hard disk technology and NetWare's Hot Fix feature have eliminated the need for a detailed disk surface analysis, according to Novell.

NetWare's easier-to-use WSGEN has replaced SHGEN, which was used to create workstation drivers. WSGEN has a format similar to the INSTALL program. WSGEN lets you quickly add a list of users. You simply type in a list of names, and NetWare creates user directories, gives basic rights, and assigns each a password (the listed name).

Although NetWare 2.2's installation is greatly improved over Version 2.15's, it is still not nearly as easy as NetWare 3.11. You still have to do a lot of disk swapping. We rate setup good.

EASE OF ADMINISTRATION:

There are only a few changes to

NetWare's ease of administration. WSGEN has been updated to more closely match Version 3.11. For example, Version 2.2 lets you define workgroup managers. This feature lets a user manage a specific group on the network, without giving that person overall supervisor's rights.

Printers can now be defined on the fly. In Version 2.15, you were required to run NETGEN and then down the server for the new printer definition.

A handy new utility, WUPDATE, lets you update any file (not just Novell files) on all workstations from the server. This gives administrators a fast way to update drivers and batch files.

NetWare 2.2's server monitor is unchanged. It does not give the extensive

system status data provided in Version 3.11's monitor utility. Version 2.2's ease of administration earns a good score.

ERROR HANDLING:

As a non-dedicated server, NetWare 2.2's SFT (System Fault Tolerance) Level 1 supports duplicate directories and file allocation tables, in addition to disk-write verification and Hot Fix, which detects bad sectors, moves data to safe locations, and masks defective sectors as bad — all on the fly.

For mission-critical applications, dedicated NetWare 2.2 servers offer SFT Level II. This provides for disk mirroring (two duplicate drives on one drive controller), disk duplexing (mirrored drives on separate controllers), and Transaction Tracking System (TTS). This last feature gives data protection to multiuser database applications. Each transaction will be written to disk as a whole. If there is a disk-write failure during a transaction update, TTS will back up the partial update.

We rate Version 2.2's error handling very good.

SUPPORT:

Support policies: Novell's first line of user support is through authorized resellers or Novell Support Organizations (NSO), such as Hewlett-Packard, Intel, and Xerox. NetWare users can, however, get direct support from Novell Technical Services (NTS) on a pay-per-incident basis. You pay a flat fee for each resolved problem, not, as is common with some vendors, a fee for each call. NTS has an 800 number, and charges are billed on your credit card. The lines are open Monday through Friday, 6 a.m. to 6 p.m. Mountain time.

Other support options include on-line services, such as CompuServe. We rate Novell's support policies satisfactory.

Technical support: Based on a survey of InfoWorld readers and rates satisfactory.

VALUE:

Similar to its amalgamation of features, NetWare 2.2's cost is a blend of NetWare 2.15's pricing structure. A five-user license for NetWare 2.2 lists for \$895; \$1,995 for 10 users; \$3,495 for 50 users; and \$5,495 for 100 users. (Novell limits the number of active users logged onto a server, not the number of named users.) By comparison, Advanced and SFT NetWare (100 users) cost \$1,995, respectively, at \$3,295 and \$4,995. The four-user ELS NetWare Level I listed for \$795, and the eight-user ELS Level II costs \$1,895. A 100-user NetWare 3.11 license lists for \$6,995.)

NetWare 2.2's pricing makes it a better value for smaller networks — up to 50 users — than the ELS, Advanced, and SFT versions it replaces. You get more features and better data security than with ELS NetWare. At 100 users, however, Version 2.2 is \$500 more than SFT NetWare.

At 100 users, NetWare 3.11 is \$1,500 more than Version 2.2, but provides 32-bit architecture, dynamic memory configuration, and the capability to span multiple disk drives.

Version 2.2's simpler installation will also make it far less intimidating to LAN users who have been designated, willingly or not, as network administrators. We rate NetWare 2.2's value very good. □

John Arriola of the Test Center contributed to this review.

REPORT CARD INFO WORLD

NETWORK OPERATING SYSTEM

NetWare Version 2.2

Criterion	(Weighting)	Score
Performance		
Speed	(200)	Very Good
Flexibility/compatibility	(150)	Excellent
Security	(75)	Very Good
Documentation	(75)	Excellent
Setup	(75)	Good
Ease of administration	(100)	Good
Error handling	(50)	Very Good
Support		
Support policies	(50)	Satisfactory
Technical support	(100)	Satisfactory
Value	(125)	Very Good
Final score		7.4

PRODUCT SUMMARY

Company: Novell Inc., 122 E. 1700 South, Provo, UT 84606; (800) NETWARE

List Price: \$895 (five users); \$1,995 (10 users); \$3,495 (50 users); \$5,495 (100 users).

Requires: Server: Intel 80286 or compatible, with 2½ megabytes of RAM (4 megabytes with VAPs installed); hard disk. Workstation: Intel 8088 or compatible, or Macintosh.

Pros: Easier installation; widespread third-party support; Mac and OS/2 connectivity; well documented; low memory requirements.

Cons: Pay-for-support policy.

Summary: NetWare Version 2.2 is better suited than previous releases to businesses with small to medium networks. Its simpler installation and well-structured documentation makes NetWare manageable for part-time, non-professional LAN administrators.

BENCHMARKS

Office Test, Heavy Load; Transaction Processing

(Times in minutes:seconds)¹

	12 Stations					24 Stations				
	NetWare 2.2	Advanced NetWare 2.15c	NetWare 386 3.1	Banyan ² Vines 386 4.0	LAN Manager 2.0	NetWare 2.2	Advanced NetWare 2.15c	NetWare 386 3.1	Banyan ² Vines 386 4.0	LAN Manager 2.0
File transfer	0:09	0:11	0:11	0:09	0:14	0:10	0:12	0:11	0:11	0:17
Database	0:27	0:32	0:29	0:26	0:51	0:32	1:00	0:36	1:36	1:59
Word processing	0:39	0:43	0:41	0:41	0:58	0:40	0:44	0:41	1:06	1:34
Spreadsheet	0:24	0:25	0:25	0:25	0:31	0:24	0:26	0:24	1:41	0:44
Total	1:39	1:51	1:46	1:41	2:34	1:46	2:22	1:52	4:34	4:34
Average TPM ⁴	5.42	5.35	5.41	5.44	4.95	2.67	2.22	2.87	2.48	1.72

All products except NetWare 2.2 reviewed in Product Comparison of February 11, Page 55.

¹Lower numbers indicate better performance.

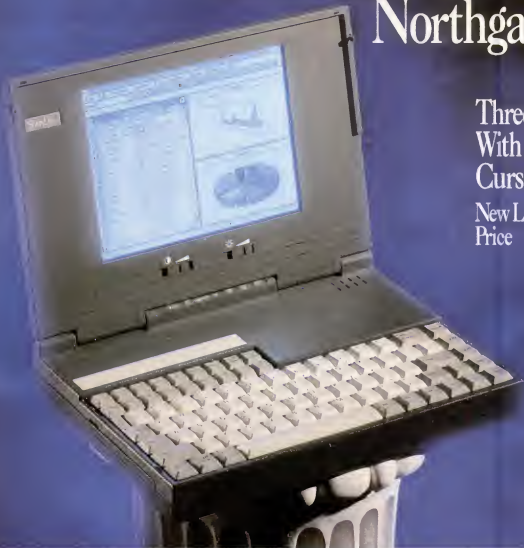
²Due to installation restrictions, we had to configure the network interface cards in all the workstations to use shared memory. This configuration theoretically could have resulted in a faster installation throughput; the network interface cards, however, were apparently not a bottleneck in Vines' performance.

³We had to reduce Paradox's swap space in order to run our scripts. This change significantly improves Paradox's performance.

⁴Transactions per minute, with maximum of 6.00 due to built-in delays; higher numbers indicate better performance.

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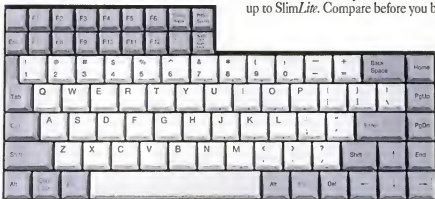
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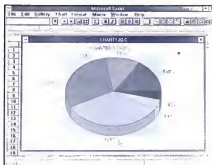
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Harvard Graphics 3.0 vs. IBM's Hollywood

BY ALAN FRIDLUND REVIEW BOARD

In these reviews we examine two of the latest PC presentation graphics packages, a market that's booming at present. Harvard Graphics 3.0 is the most recent upgrade of Software Publishing's well-established product. Despite its DOS-based environment, Harvard Graphics offers a totally revamped drawing and presentation environment that pushes the DOS envelope for variety and richness of features. It still retains the edge in numeric capabilities, including statistical and calculational functions the others lack. Competing with Harvard Graphics is Hollywood, IBM's first shot at the presentation graphics market. Hollywood is a slick Windows product that offers superior presentation options: single-file presentation, light-table slide sorter, and a multifunctional screen-show facility that includes a stand-alone Windows player. It is a full-featured presentation powerhouse — a serious contender in the Windows market. Though Hollywood lacks the ease of use enjoyed by Microsoft PowerPoint and Aldus Persuasion, it will give them a run for the money.

We tested Harvard Graphics and Hollywood with the test plan from our November 19, 1990, product comparison ("Rapid Fire Presentations," Page 63). Our next product comparison is scheduled for the September 16 issue; at that time we will re-evaluate the way we test these products, to take into account the rapid changes in the market, so many scores may change.

— Anne Kaliczak

Version 3.0 of Harvard Graphics improves drawing, color features

Harvard Graphics from Software Publishing Corp. (SPC) abandons its gray-suited image with a splashy but solid update that's dramatically improved in its drawing tools, color handling, scalable fonts, presentation focus, and chart types. Version 3.0 is not quite a presentation-focused package like Microsoft PowerPoint or Hollywood. It is still limited in data entry, but it is a whiz-bang DOS package that's powerful and fun to use.

FEATURES:

The improvements made to Version 3.0 are considerable. The old rough-edged screen fonts are supplanted by the latest Bitstream scalable font technology; the number of charts and chart colors have been expanded; and the clunky Draw Partner interface (poorly grafted onto Version 2.3) has been updated and integrated entirely into a terrific drawing screen.

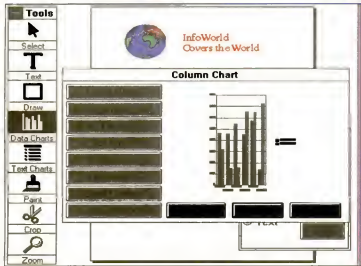
PERFORMANCE:

Text charting: Version 3.0 offers dedicat-

ed routines for bullet charts, text charts, data tables, and organization charts. But the biggest change in text charting is the addition of Bitstream Speedo fonts (15 typefaces are provided, and more can be purchased from Bitstream). These can be used both for output to your printer and on-screen in a true WYSIWYG device-specific manner. Five other typefaces were retained from the rougher native fonts used in previous versions of Harvard Graphics. In addition, the program also supports fonts internal to your output device (e.g., LaserJet printers).

If you use scalable fonts, you can enter text directly on-screen using a text tool that lets you select the font type, size, and position with the mouse. In addition, you can enter text in a word-wrap box, paste it into a chart, and use the mouse to move and resize the text by selecting it and dragging its object boundary handles. You can even enter text around chart objects, and create three separate charts out of a single bullet chart using the auto-build feature. This feature enables you to

See Harvard Graphics, page 76



Harvard Graphics' new Draw Window includes dozens of drawing tools that enable you to embellish your charts with original graphics.



After data has been imported into Hollywood's Data Manager, you can design, customize and then paste any type of chart onto the current slide.

IBM's 'Hollywood' hits the big screen, upstaging Lotus, SPC

IBM has thrown its hat into the Windows presentation graphics ring, beating both Lotus and SPC with its latest desktop presentation package — appropriately named Hollywood. As its name suggests, Hollywood marries many of the slick presentation features of Microsoft's PowerPoint for Windows with the graphical prowess of Micrograf's Charisma to create a solid, feature-laden program.

FEATURES:

Hollywood formats the slides according to the output device you ultimately want to print to — 35mm slides, overheads, screen, laser printer — and it chooses the appropriate chart sizes, formats, and color schemes. This is a nice feature that takes the guesswork out of designing slides to fit the media and eliminates a lot of errors.

To create text charts, Hollywood integrates a text outliner and a spelling checker with standard word processing features, providing an integrated environment that takes you from conception to completion in one step. Numeric charts are created by the spreadsheet-like Data Manager and then embellished with clip art or with Hollywood's complete set of drawing and recoloring tools. After you have created a series of charts, you can design a master slide backdrop, which gives consistency to your presentation, and then organize the charts using IBM's unique "slide-table" screen.

Once your presentation is completed, you can change it into a special effects screen show, obtain hard copies from your printer or slide camera, and/or send your slides via modem to an overnight 35mm slide processing service.

PERFORMANCE:

Text charting: You can make text charts in Hollywood directly from the outliner or import them from existing files in

ASCII, WordPerfect, or Displaywrite formats. There are three kinds of text charts available in Hollywood: bullet charts, "tree" (organizational) charts, and data tables. The first two are composed directly from Hollywood's outliner, automatically translating different outline levels into proper positions in the chart.

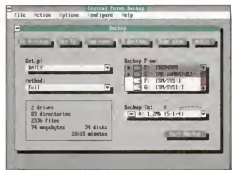
A special layering function is available when you build bullet charts. It lets you place each bulleted item on a separate chart layer, so you can reveal different levels for emphasis during a screen show. Bullets can be defined as any character from any font. There is also an "active bullet" option that automatically places the selected bullet only on the active chart layer. Charts made up of data tables are based on information you enter into the spreadsheet Data Manager.

You can check the accuracy of your all-text charts by using Hollywood's spelling checker. Text charts of any kind can be saved as templates, which can later be recalled and reused as needed. However, in contrast to packages such as DrawPerfect, Hollywood's template offerings are meager and not WYSIWYG. Likewise for the outliner and text charts: You have to display the chart to see what the text looks like. We'd prefer much more WYSIWYG in both the template offerings and text charts. Still, the breadth and charting capabilities incorporated into Hollywood merit a score of very good for text charting.

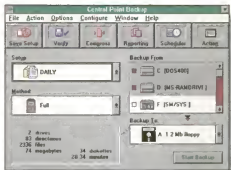
Numeric charting: Hollywood can produce a wide range of numeric chart types, including area, high-low-close, bar (stacked, overlapped, or clustered by groups), pies, lines and stacked lines with variable line thickness, and scatterplots. Charts can be inverted or horizontal, and three-dimensional effects with variable perspective are available for nearly all. Finding the graph you want simply

See Hollywood, page 77

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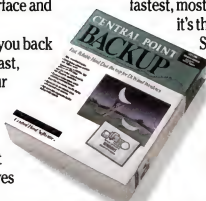
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HARVARD GRAPHICS / from page 72

Version 3.0 improves drawing and color features

overlay charts, creating the effect of dimming specific lines for emphasis.

These new fonts and features are a step in the right direction, but you'll still create more of a standard text chart using the program's annoying text-mode panels. In addition, there is no outline function. So to make a bullet chart, for example, you have to set the text's outline level by typing in text using the cursor keys and then select the font style and size numerically in a pop-up menu. This function is very tedious, and it could be better implemented directly in the Draw Window.

Organizational charts are created using text forms. You use the cursor keys to add levels and boxes, and pop-up windows enable you to make labels for each box. This obviates the need to draw the boxes yourself.

Finally, the spelling checker now has a 130,000-word vocabulary (Version 2.3 had 70,000) that ensures you don't make embarrassing spelling errors on your text charts. We rate text charting very good.

Numeric charting. Harvard Graphics has historically been the presentation graphics leader in mathematical and numeric charting capabilities. Even before charting, you can use Harvard Graphics' internal math functions to optimize your presentation data. You can use the built-in pop-up calculator, for example, to interpolate a missing value and perform calculations on your data, such as sums, differences, means, moving averages, percentages, logs, sines and cosines, and linear and exponential regression. You can calculate descriptive statistics on any data series and for correlations among them. (Version 3.0 can now handle up to 16 sets of data with 1,000 points in each.) By using simple commands you can copy, move, or exchange data columns.

When you've gotten your data in shape, you can select from a wide variety of numeric charts. Harvard Graphics lets you make pies, lines and curved lines, scatterplots, horizontal and vertical bars (stacked or overlapped), and high-low-close and area charts. Three-dimensional effects are available for most charts, and you can combine charts and place multiple charts on a page. In addition, both x- and y-axes can be logarithmically scaled. We found only one minor problem — there is no way to break axes to handle uneven values.

There are a few new chart options, including cylinders, pyramids, and octagons that can be used as jagged alternatives to 3-D bars. In addition, Version 3.0 now lets you specify depth on 3-D charts.

We rate Harvard Graphics 3.0's numeric charting excellent.

Editing capabilities: This is the area in which Harvard Graphics 3.0 has most improved. The primitive draw window and companion Draw Partner program have been replaced by a new Draw Window that may be the best we've seen in any presentation graphics package to date.

You can draw freehand shapes or regular lines, boxes, n-sided irregular or equal polygons, Bezier curves, circles and ovals. In addition, an "evolve" utility lets you sweep a point or group of points across the screen, giving you a stroboscopic effect. A multistep zoom facility lets you get in close to make detailed changes, and a separate scratchpad screen lets you doodle and experiment until you're ready to

paste what you've done to your chart.

Another Draw Window option lets you add color patterns or gradient fills. Each chart can have up to 64 separate colors in each of 32 chart palettes (with additional colors created by dithering or pattern fills). Moreover, there's now a bit-map facility that can import PCX or one of the supplied native-format PCP bit-map files. You can use these bit-map images to fill either the entire screen or individual chart objects or edit them and save them as symbols. For example, you can make your company logo a symbol and import it routinely as an object into every chart you create.

Version 3.0 also increases the latitude you have in editing a chart without unloading it from your data. You simply define "chart regions" that retain their original perspective despite other changes in the chart. You have the ability to cut and paste objects; group and ungroup; move and resize; snap-align, flip, rotate,

100 types of dot-matrix and laser printers (including over 20 color printers); three types of graphics tablets, six types of plotters, and 10 types of film recorders (SCODL files are created to drive these).

Using the supplied communications program, you can also phone AutoGraph and transmit your chart files for overnight slide service.

However, Harvard Graphics still doesn't support 256 colors or display modes beyond standard 640-by-480 VGA.

We rate output support very good.

Import/export: Harvard Graphics 3.0 can import and chart both spreadsheet data and graphs created by Lotus 1-2-3, Symphony, or Excel. Importing is done by using a "capture" routine in which you specify the variable names and data ranges you want to import by using the menu to select portions of the original document and type this information (as well). You can also import and chart data from ASCII and dBase files.

Charts can be linked to data files so that changes in the data are automatically reflected when you redisplay the chart.

Harvard Graphics 3.0's Draw Window and Draw Partner have been replaced by new drawing functions that may be the best we've seen in any presentation graphics package.

and tilt; and add drop shadows. These are merely a few of the more than 35 effects that comprise drawing and editing tools. For added flair SPC includes a 500-symbol clip-art library (additional libraries can be ordered from the vendor). We rate Harvard Graphics' editing capabilities excellent.

Presentation tools: Harvard Graphics' slide-show routine comprises much of its improved but still limited presentation capabilities. Screen shows can use more than a dozen transition effects (e.g., wipes, blinds, scrolls, and fades) with timing and direction that you can set. You can also choose objects for successive display or recolor within a chart, producing neat animation effects. By using a similar process called auto-build on text charts, you can dramatically reveal chart information in steps.

In addition, the included memory-resident screen-capture utility enables you to save any EGA screen (the screen show runs only in EGA resolution) as a PCX file, which can then be added to your screen show. Harvard Graphics adds a neat function called "hypershow" that links one chart to another in a screen show with on-screen "buttons" that you can activate using a keyboard or mouse.

Harvard Graphics still lacks the top-down features that help you in putting together an integral presentation. There's no "slide table" for thumbnail previewing or rearranging of charts, no outline, and charts aren't preformatted for different display formats (e.g., slides vs. overheads), although the screen preview is device-specific. On the other hand, Harvard Graphics was one of the first DOS packages to produce audience handouts and speaker's notes automatically. On balance, Harvard's presentation tools are good.

Output: Harvard Graphics has always featured support for a wide range of devices. Version 3.0 supports more than

Harvard Graphics still hasn't substantially improved its graphics import capabilities. You're limited to importing PCX and TIFF files, but there is one important enhancement: You can now import individual files (in addition to the native PCP bit-map files).

Charts can be exported to Software Publishing's Professional Write format, Corel's PS, HPGL, plotter, PCX, or SCODL file formats. Compared to the competition, Harvard Graphics' data import facilities are strong, but its graphic import/export capabilities are relatively deficient. Overall, we rate import/export facilities satisfactory.

DOCUMENTATION:

Version 3.0's documentation has been completely revamped. The main reference text is the 600-page users' manual, whose formatting and use of screen shots is better than previous versions. Separate manuals guide installation and network use, inform longtime users of changes from prior versions, and depict the supplied clip-art symbols and standard color palettes. A quick-reference card summarizes basic program operation and drawing tools. In addition, there is a context-sensitive help system and a great on-line tutorial. We rate documentation very good.

EASE OF LEARNING:

Harvard Graphics comes on five floppy disks (Both 5 1/4-inch 1.44-megabyte and 5 1/4-inch 1.2-megabyte disks are included.) You'll need between 3 and 12 megabytes of space on your hard disk, depending upon whether you choose to install all charts, symbols, etc., or just the basic graphics. Installing the entire package went smoothly and took about 15 minutes total.

Harvard Graphics is logically organized, and an on-screen tutorial takes you through the basics of the program.

However, learning is stunted somewhat by the mixed text-and-graphics orientation of the package and the many available options on the chart forms. Version 3.0 has blissfully simplified the latter by making chart options selectable from hierarchical pop-up menus. But overall, Harvard Graphics has you creating presentations fast, facilitated by the context-sensitive help and the intuitive on-line tutorial. We rate ease of learning very good.

EASE OF USE:

The text-mode chart forms still force you to shuttle in and out of the Draw Window — slowing down your charting. Still, the new Draw Window, color and text facilities, and the simplified chart option menus all combine to make Version 3.0 much easier to use than previous versions. If you use the package frequently, you can create chart templates and keyboard macros that will speed your work even further. Developing macros is made easier using the built-in keystroke recorder. We rate ease of use very good.

ERROR HANDLING:

Like its predecessors, we found Harvard Graphics 3.0 to be bulletproof. We literally could not crash the program. The program offers a single-level undo and does not provide automatic timed backups, but it does prompt you to save your work before you clear the screen or begin a new chart. We never felt that our data was at risk. We rate Harvard Graphics 3.0's error handling good.

SUPPORT:

Support policies: Registered users receive product upgrades at reduced prices and unlimited support via telephone or fax (neither is toll free) from 7 a.m. to 4 p.m. Pacific time. In addition, SPC offers a 30-day money-back guarantee and operates an active support forum on CompuServe (GO.SPC).

We rate support policies good.

Technical support: We made numerous calls to technical support, and we were frequently put on hold for a short time. The technicians we reached were

PRODUCT SUMMARY

Harvard Graphics

VERSION 3.0

Company: Software Publishing Corp., P.O. Box 7210, 1901 Landings Drive, Mountain View, CA 94039-7210; (415) 962-8910.

List Price \$595.

Requires: Intel 8088 or compatible; 640K of memory (can use extended or expanded memory); high-density floppy hard disk (occupies from 3 to 12 megabytes); DOS 3.0 or later; graphics adapter; Microsoft or IBM-compatible mouse recommended.

Pros: Great screen-show routines; superior numeric and drawing tools; enhanced screen-capture utility; extensive chart gallery; new scalable fonts; built-in spelling checker.

Cons: Limited graphics import and export capabilities; retains text-mode data entry forms that require shutting between data and charts.

Summary: Harvard Graphics repositions itself on the top rung of DOS charting packages. Version 3.0 is a winner with new charting, drawing, color, and text capabilities.

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QUESTIONS ABOUT YOUR JOB:

1 WHAT IS YOUR ORGANIZATION'S PRIMARY BUSINESS ACTIVITY AT THIS LOCATION? (PLEASE CHECK ONE ONLY).

Non-Computer-Related Businesses

- ☐ 01 Amusement
- ☐ 02 Manufacturer (non-computer related)
- ☐ 03 Finance/banking/accounting/insurance/real estate
- ☐ 04 Government: federal (including military)
- ☐ 05 Government: state and local
- ☐ 06 Retailer/distributor/wholesaler
- ☐ 07 Consulting/engineering/architecture/construction
- ☐ 08 Research and development
- ☐ 09 Health/medical/legal
- ☐ 10 Communications/publishing/broadcasting
- ☐ 11 Transportation/utilities
- ☐ 12 Hotels/amusement/non-profit organizations
- ☐ 13 Education: college/university
- ☐ 14 Education: schools K-12
- ☐ 19 Other non-computer-related business

Computer-Related Businesses

- ☐ 20 Computer consultant/networking consultant
- ☐ 21 Computer manufacturer (hardware, software, peripherals, etc.)
- ☐ 22 Computer distributor/wholesaler
- ☐ 23 Computer retailer
- ☐ 24 VAR/VAD/systems integrator
- ☐ 29 Other computer-related business

2 WHICH OF THE FOLLOWING BEST DESCRIBES YOUR TITLE? (PLEASE CHECK ONE ONLY).

Computer Systems/Operations/Networking

- ☐ 30 MIS/DP Director/Manager
- ☐ 31 Microcomputer Manager
- ☐ 32 Networking Director/Manager
- ☐ 33 Data/Telecommunication Manager
- ☐ 34 Information Center Manager
- ☐ 35 Microcomputer Specialist
- ☐ 36 Programmer/Systems Analyst
- ☐ 40 Other computer-related professional staff specialist

Management

- ☐ 41 Chairman/President/Owner/Partner
- ☐ 42 C/O/Controller/Treasurer
- ☐ 43 COO
- ☐ 44 Vice President/General Manager
- ☐ 45 Department head or manager
- ☐ 46 Other management
- ☐ 47 Professional
- ☐ 50 Professional
- ☐ 55 Other titled personnel

3 WHICH OF THE FOLLOWING BEST DESCRIBES YOUR DEPARTMENT OR PRIMARY JOB FUNCTION? (PLEASE CHECK ONE ONLY).

- ☐ 75 MIS/DP
- ☐ 76 Networking/Communications
- ☐ 77 Information Center/Microcomputer center
- ☐ 78 Operations
- ☐ 79 Engineering
- ☐ 80 Research and Development
- ☐ 81 Accounting/Finance
- ☐ 82 Administration/Management
- ☐ 83 Manufacturing/Quality Control/Purchasing
- ☐ 84 Consulting
- ☐ 85 Sales/Marketing
- ☐ 86 Education/Training
- ☐ 89 Other _____ (please specify)

4 ARE YOU A MEMBER OF A COMPANY-WIDE PC AND/OR SOFTWARE COMMITTEE?

- ☐ Yes ☐ No

5 IN WHICH WAYS ARE YOU PERSONALLY INVOLVED IN YOUR ORGANIZATION'S DECISIONS TO PURCHASE THESE PRODUCTS? (CHECK ALL THAT APPLY).

	1 Determine Need	2 Determine Features	3 Evaluate Brands	4 Specify/Recommend Brands	5 Specify/Recommend Vendor/Supplier	6 Authorize the Purchase	8 None of These
A. Microcomputers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Peripherals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Software	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Data Network Products (LAN/WAN)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6 DO YOU RECOMMEND, BUY, SPECIFY OR APPROVE MICROCOMPUTERS, SOFTWARE, AND/OR PERIPHERALS? IF YES, PLEASE INDICATE FOR HOW MANY PERSONAL COMPUTERS OR MICROCOMPUTER SYSTEMS YOU HAVE THIS INVOLVEMENT. (PLEASE CHECK ONE ONLY).

<input type="checkbox"/> 13 2,000 or more	<input type="checkbox"/> 08 200-499	<input type="checkbox"/> 04 10-24	<input type="checkbox"/> 99 None of the above
<input type="checkbox"/> 12 1,500-1,999	<input type="checkbox"/> 07 100-199	<input type="checkbox"/> 03 7-9	
<input type="checkbox"/> 11 1,000-1,499	<input type="checkbox"/> 06 50-99	<input type="checkbox"/> 02 4-6	
<input type="checkbox"/> 09 500-999	<input type="checkbox"/> 05 25-49	<input type="checkbox"/> 01 1-3	

7 OVER THE COURSE OF ONE YEAR, DO YOU RECOMMEND, BUY, SPECIFY OR APPROVE MICROCOMPUTERS, SOFTWARE, PERIPHERALS, OR SERVICES WORK? (PLEASE CHECK ONE ONLY).

<input type="checkbox"/> 11 \$2,500,000 or more	<input type="checkbox"/> 07 \$400,000 to \$599,999	<input type="checkbox"/> 04 \$10,000 to \$99,999	<input type="checkbox"/> 01 Less than \$10,000
<input type="checkbox"/> 10 \$1,000,000 to \$2,499,999	<input type="checkbox"/> 06 \$200,000 to \$399,999	<input type="checkbox"/> 03 \$25,000 to \$99,999	<input type="checkbox"/> 99 None of the above
<input type="checkbox"/> 08 \$600,000 to \$999,999	<input type="checkbox"/> 05 \$100,000 to \$199,999	<input type="checkbox"/> 02 \$10,000 to \$24,999	

8 DO YOU SPECIFY, RECOMMEND, BUY, OR APPROVE THE PURCHASE OF ANY OF THE PRODUCTS OR SERVICES LISTED BELOW:

- ☐ Yes (if yes, please check all that apply) ☐ No

Computers

- ☐ 01 PC and PC/XT class desktop (8086-1088)
- ☐ 02 PC/AT class desktop (80286)
- ☐ 03 80386-class PC's desktop
- ☐ 04 80486-class PC's desktop
- ☐ 05 Workstations (Sun, DEC, Nix/XT, HP)
- ☐ 06 PS/2 Models 25, 50 and 30 class desktop (8086-8088)
- ☐ 07 PS/2 Models 50, 50x and 60 class desktop (80386)
- ☐ 08 PS/2 Models 70 and 80 class desktop (80386)
- ☐ 09 Laptops (lighter than 7 lbs.)
- ☐ 10 Notebooks (less than 7 lbs.)
- ☐ 11 Macintosh
- ☐ 12 Other microcomputers
- ☐ 13 Minicomputers
- ☐ 14 Mainframe computers

Software

- ☐ 16 Spreadsheets
- ☐ 17 Financial planning or modeling
- ☐ 18 Accounting
- ☐ 19 Word processors
- ☐ 20 Text retrieval or search
- ☐ 21 Relational database management
- ☐ 22 Flatfile database management
- ☐ 23 Desktop publishing
- ☐ 24 Graphics/presentation
- ☐ 25 Drawing or plotting
- ☐ 26 CAD/CAM/CAE
- ☐ 27 Knowledge bases (i.e., technical, reference data)
- ☐ 28 Project management
- ☐ 29 Communications
- ☐ 30 Integrated software (i.e., Smart, Symphony)
- ☐ 31 Utilities
- ☐ 32 Programming/languages
- ☐ 33 Expert systems/critical task intelligence
- ☐ 34 Personal information management
- ☐ 35 File security and encryption
- ☐ 36 Back-up
- ☐ 37 Operating system software
- ☐ 38 Statistics
- ☐ 40 Other _____

Peripherals

- ☐ 41 Dot matrix printers
- ☐ 42 Laser printers
- ☐ 43 Ink-Jet printers
- ☐ 44 Color printers
- ☐ 45 Plotters
- ☐ 46 High speed line printers
- ☐ 47 Other printers or plotters
- ☐ 48 Monochrome monitors
- ☐ 49 Color monitors

- ☐ 50 Full-page monitors
- ☐ 52 Other monitors
- ☐ 53 Multi-function boards
- ☐ 54 Turbo or accelerator boards
- ☐ 55 Video display boards
- ☐ 56 Memory boards
- ☐ 57 FAX boards
- ☐ 60 Other boards
- ☐ 61 Keyboard
- ☐ 62 Mouse
- ☐ 63 Scanning devices
- ☐ 66 Other input devices
- ☐ 67 Diskette drives (5 1/4 or 3 1/2 inch)
- ☐ 68 CD-ROM or optical disk drives
- ☐ 69 Hard disk drives
- ☐ 70 Tape drives
- ☐ 71 Other disk drives

Data Communications/Local Area Networks/

- ☐ 72 Wide Area Networks
- ☐ 73 Modems 2400-9600 BPS
- ☐ 74 Modems greater than 9600 BPS
- ☐ 77 Peripheral steering devices (print servers)
- ☐ 78 Protocol converters
- ☐ 79 Network operating systems
- ☐ 80 Network E-mail programs
- ☐ 81 Network-integrated PC applications
- ☐ 82 Network interface cards
- ☐ 83 Internetworking equipment (gateways, bridges, routers)
- ☐ 84 Micro-to-mainframe equipment (i.e., 3270 emulation boards)
- ☐ 85 Network file servers
- ☐ 86 Multiplexers

Other services

- ☐ 90 Education/Training
- ☐ 91 Application development
- ☐ 92 Maintenance services contracts
- ☐ 93 Rental or leasing agreements
- ☐ 94 On-line services

Miscellaneous products

- ☐ 96 Ducts
- ☐ 97 Surge protectors
- ☐ 98 Consumables (paper, ribbons)
- ☐ 99 Other _____

PLEASE TURN THIS FORM OVER AND ANSWER QUESTIONS ON THE BACK.

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9 HOW MANY PEOPLE ARE EMPLOYED AT YOUR LOCATION?
(PLEASE CHECK ONE ONLY)

- ☐ 09. 10,000 or more ☐ 04. 100-499
☐ 08. 5,000-9,999 ☐ 03. 25-99
☐ 07. 2,500-4,999 ☐ 02. 10-24
☐ 06. 1,000-2,499 ☐ 01. Less than 10
☐ 05. 500-999

10 HOW MANY PEOPLE ARE EMPLOYED IN YOUR ENTIRE ORGANIZATION, INCLUDING ALL OF ITS BRANCHES, DIVISIONS AND SUBSIDIARIES?
(PLEASE CHECK ONE ONLY)

- ☐ 10. 20,000 or more ☐ 05. 500-999
☐ 09. 10,000-19,999 ☐ 04. 100-499
☐ 08. 5,000-9,999 ☐ 03. 25-99
☐ 07. 2,500-4,999 ☐ 02. 10-24
☐ 06. 1,000-2,499 ☐ 01. Less than 10

11 ARE THERE ANY MAINFRAME OR MINICOMPUTERS AT YOUR LOCATION?
(If Yes (if yes, please check all that apply) ☐ No

- ☐ A. Mainframe ☐ B. Minicomputer

**DID YOU REMEMBER TO SIGN
AND DATE YOUR APPLICATION?**

12 TYPES OF PERSONAL COMPUTERS OR MICRO-COMPUTER SYSTEMS AT YOUR LOCATION?
(If Yes (if yes, please give the quantity below for each model) ☐ No

Machine Type and Model	Currently Own	Plan to Purchase Within 12 Months
Microcomputers		
A. PC and PC/XT class		
B. PC/AT class		
C. PC's based on 80386 chip		
D. PC's based on 80486 chip		
E. PS/2 Model 25, 30		
F. PS/2 Model 50, 50		
G. PS/2 Model 70, 80		
H. Laptops		
I. Notebooks		
J. Macintosh		
K. Engineering workstations		
L. All other		
LAN's		
M. Total # of LAN's		
N. Total # of PC's connected to these LAN's		
O. Total # of file servers		

13 ENVIRONMENTS, OFFICE AUTOMATION PLATFORMS, AND/OR LAN OPERATING SYSTEMS UTILIZED AT YOUR LOCATION.
(PLEASE CHECK ALL THAT APPLY)

- ☐ 01. MS-DOS or PC-DOS ☐ 11. Novell's Netware
☐ 02. Windows ☐ 12. AppleTalk/AppleShare
☐ 03. Unix or Xenix ☐ 13. IBM's PC Network
☐ 04. OS/2 ☐ 14. IBM's OS/2 LAN Server
☐ 05. Macintosh ☐ 15. Tops
☐ 06. IBM Office Vision ☐ 16. Banyan Vines
☐ 07. DEC All-In-One ☐ 17. Microsoft's LAN Manager
☐ 08. HP New Wave ☐ 18. Other (please specify)
☐ 09. AT&T Rhapsody
☐ 10. NCR Cooperation

14 THE PERSONAL COMPUTERS OR MICROCOMPUTER SYSTEMS AT YOUR LOCATION HAVE THE FOLLOWING COMMUNICATIONS CAPABILITIES:
(PLEASE CHECK ALL THAT APPLY)

- ☐ 01. Communicate with modems via modem
☐ 02. Local area network
☐ 03. Communicate with internal company mainframe or mini
☐ 04. Communicate with outside service bureau, database, or time-sharing service
☐ 05. Voice/data
☐ 06. None of the above

15 THE PERSONAL COMPUTERS OR MICROCOMPUTER SYSTEMS AT YOUR LOCATION ARE NORMALLY PURCHASED FROM:
(PLEASE CHECK ALL THAT APPLY)

- ☐ 01. Retail computer store ☐ 04. Mail order firm
☐ 02. Manufacturer ☐ 05. Other (please specify)
☐ 03. Distributor/wholesaler/system house ☐ 06. None of the above



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16 WHICH OF THE FOLLOWING PUBLICATIONS DO YOU RECEIVE ADDRESSED PERSONALLY TO YOU?
(PLEASE CHECK ALL THAT APPLY)

- ☐ 01. Byte ☐ 05. NetworkWorld
☐ 02. Communications Week ☐ 06. PC Magazine
☐ 03. Computerworld ☐ 07. PC Week
☐ 04. LAN Times ☐ 08. PC World



extremely knowledgeable and helpful. We rate technical support good.

VALUE:

Version 3.0 (\$595) is \$100 more than the previous version and IBM's Hollywood. SPC has added a host of new features that leave its conservative past behind. It is easier to use than Hollywood, and it has much better numeric capabilities and more charting functions, but it is lacking in presentation tools. It has a greater color capability than Freelance, better numeric charting, and is easier to use. However, Freelance is less expensive and offers a greater wealth of import/export options.

Both Harvard Graphics and Freelance are still missing a wholly graphics-mode version with simultaneous views of data and charts and a single file per presentation (we're eagerly awaiting the Windows version). But the package's talents are now far greater, and it's getting downright fun to use. We rate value very good.

HOLLYWOOD / from page 69 Presentation package outshines its competitors

involves picking it from the visual chart gallery and building complex charts is simplified by Hollywood's "layering" capability. This feature lets you visually contrast data sets or views of the same data and present them either superimposed or in succession.

The Data Manager imports, selects, and charts data. You can insert, delete, and swap rows or columns; and paste to and from the Windows clipboard. But you can't do any data manipulation (e.g., transposition, transformation, and running averages).

When you bring data into the Data Manager, you have to select a "draw chart" option before you are able to see your chart. In addition, if you want to edit a data point, you have to shuttle back to the Data Manager, meanwhile losing

your view of the graph.

A few of the more glaring problems are that y-axes but not x-axes can be scaled logarithmically, thus precluding log-log charts. Nor can axes be broken to accommodate outlying values. Pies can be proportional and you can vary their orientation, including pulling slices for emphasis. To add error bars to bar or line charts, you have to fabricate them using high-low-close charts or draw them manually. Although Hollywood lacks numeric calculation, it is not alone. Most of the other presentation graphics products—such as Freelance, Persuasion, Charisma and Harvard—also fall short in this area. However, Hollywood does have a wide range of flexible charting options; we rate it very good in numeric charting.

Editing capabilities: One of Hollywood's greatest strengths lies in its editing tools. Once you've created a basic chart, you can import, resize, recolor, and pattern-fill. Using specialized tools, you can paint and spray broad areas with fills and colors. You can also draw circles, Bezier curves, lines of varying thickness, arrows with selectable arrowhead types, squares and rectangles with optional rounded corners, "chiseled" shading, and three-dimensional perspective.

Hollywood also includes a clever tool that lets you draw a polygon and then drag its vertices until it reflects the shape you want. This capability outpaces the "polyline" tool that many other packages contain. Any shapes that are created with it can either be aligned by hand or precisely placed using the snap-to-grid option.

Hollywood's text-editing tools are just as versatile as those for graphical objects. By using the Bitstream fonts that Hollywood includes, you can add text shadows with variable angles, colors and color washes; rotate, flip, and mirror text; and make a circle of text into an object (a talent Harvard Graphics includes, and which is possible only via a slow macro in DrawPerfect).

To live up to presentations, there's a small clip-art library of 100 images of maps, flags, and miscellaneous symbols. (Additional clip art is available at discount.) This offering is small compared to nearly all of Hollywood's competition. Aside from the lack of clip art, Hollywood has a wide range of useful editing tools. We rate editing capabilities very good.

Presentation tools: Hollywood incorporates many of the desktop presentation conveniences we were introduced to in PowerPoint for Windows and have come to expect.

The first and most important is that all parts of your presentation (e.g., text, charts, chart order, speaker's notes) are contained within a single file. We can't understate how convenient this feature is, especially when you have to make several presentations that are all variations on the same theme. You just copy and rename the presentation files and change specific elements instead of creating a whole new layout.

Another nice organizational feature that PowerPoint pioneered and Hollywood picked up is the capability to design a master "slide page" that contains a custom frame, logo, or color scheme. The master page, like all other slide pages, is sized for the output device you select.

However, if you change the output device after your presentation is completed, the objects might not all appear correctly on the new page. This problem will be fixed in the next upgrade.

After you've assembled the charts that make up your presentation, you can view thumbnails of each slide on a "light table" screen. These thumbnails can then be reordered by using your mouse to drag them around the "table" (similar to PowerPoint). In addition, Hollywood also generates speaker's notes and audience handouts to accompany the slides.

Hollywood's screen show facility includes a wealth of special features and options. It features 16 transitional effects, including fades, wipes, blinds, spirals and zooms. Transitions can be timed or controlled by the keyboard or mouse. You can further exploit Hollywood's "layering" feature to show progressive builds or chart slides.

Hollywood's screen-show program is free-standing and doesn't require the full-blown Hollywood application. This is a convenient feature if you need to send presentations to a remote location or give presentations off-site. Regrettably, you can only run the screen-show facility on a PC equipped with Windows. For broader appeal, we'd like to see a DOS version of the screen-show program. Overall, we rate Hollywood's presentation tools excellent.

Output: Unlike PowerPoint or Charisma, Hollywood incorporates the latest Bitstream scalable font technology, allowing more flexible text handling and a wide variety of special effects. For both screen display and hard copy, Hollywood uses standard Windows fonts and the supplied Bitstream fonts (versions of Times, Roman, Helvetica, and Dingbats are supplied). The latter are scalable from 6 to 360 points.

Hollywood supports all Windows-compatible displays and printers (including Postscript printers), and the supplied SCODL driver supports Matrix size recorders.

In addition, Hollywood includes a communications utility that enables you to send your charts to MaciCorp for slide processing. When printing your slides,

REPORT CARD

INFO WORLD

Presentation Graphics Software

			IBM Hollywood for Windows Version 1.0	SPC Harvard Graphics for DOS Version 3.0
(InfoWorld weighting)	(Your weighting)			
List Price			\$495	\$595
Performance				
Text charting	(100)	()	Very Good	Very Good
Numeric charting	(100)	()	Very Good	Excellent
Editing capabilities	(75)	()	Very Good	Excellent
Presentation tools	(75)	()	Excellent	Good
Output	(75)	()	Excellent	Very Good
Import/export	(75)	()	Very Good	Satisfactory
Documentation	(75)	()	Very Good	Very Good
Ease of learning	(100)	()	Good	Very Good
Ease of use	(125)	()	Good	Very Good
Error handling	(50)	()	Very Good	Good
Support				
Support policies	(25)	()	Very Good	Very Good
Technical support	(50)	()	Good	Good
Value	(75)	()	Very Good	Very Good
Final scores			7.4	7.5

Use your own weightings to calculate your score

GUIDE TO REPORT CARD SCORES

InfoWorld reviews only finished, production versions of products, never beta test versions. Products receive ratings ranging from unacceptable to excellent in various categories. Scores are derived by multiplying the weighting (in parentheses) of each criterion by its rating, where:

Excellent = 1.0 — Outstanding in all areas.

Very Good = 0.75 — Meets all essential criteria and offers significant advantages.

Good = 0.625 — Meets essential criteria and includes some special features.

Satisfactory = 0.5 — Meets essential criteria.

Poor = 0.25 — Falls short in essential areas.

Unacceptable or N/A = 0.0 — Fails to meet minimum standards or lacks this feature.

Scores are summed, divided by 100, and rounded down to one decimal place to yield the final score out of a maximum possible score of 10 (plus bonus). Products rated within 0.2 points of one another differ little. Weightings represent average relative importance to InfoWorld readers involved in purchasing and using that product category. You can customize the report card to your company's needs by using your own weightings to calculate the final score.

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PRODUCT SUMMARY

Hollywood for Windows

VERSION 1.0

Company: IBM Corp., Desktop Software, Application Systems Division, 472 Wheelers Farms Road, Milford, CT 06460; (800) IBM-7699.

List Price \$495.

Requires: Intel 80286 or compatible

(386 recommended); 2 megabytes of

RAM; high-resolution graphics, hard disk

occupies 8 to 12 megabytes; DOS 3.30

later; Windows 3.0; Microsoft- or IBM-

compatible mouse; graphics adapter

supported by Windows 3.0.

Pros: Excellent color handling, drawing

tools; strong text handling; scalable

fonts; integrated outlining; screen chart

"layering"; great screen-show utility.

Cons: Clunky program organization; limited

standard clip art.

Summary: IBM's entry in desktop

presentation software excels in text, color,

and custom drawing, but it's tougher to

learn than PowerPoint and lacks its in-

tuitive organization.



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Hollywood offers a multitude of options. You can batch-print all charts in your presentation, select a few specific slides, print in forward or reverse order, or print single or multiple copies, which can be collated or uncollated. On our VGA display and LaserJet II printer, images were sharp, high-quality representations of the slides. We rate output excellent.

Import/export: Hollywood can import and export an impressively long list of standard and non-standard file types, including TIFF, CGM, Microsoft Paint, PIC (Charisma and IBM's own Storyboard Plus), Windows BMP, and CompuServe GIF. Additionally, you can import HPGL, Windows' metafiles, MacPaint, and AutoCAD DXF files. You can also use the Data Manager to import data from Excel and Lotus WK1 worksheet files and text in DisplayWrite RFT, WordPerfect, and ASCII formats. If you import Excel or Lotus data, you can link your graph to the original data files. Hollywood lets you "freshen" its imported data with a single command, but it's not a true "hot link." Files can be exported in EPS.

Hollywood impressed us. It is chock-full of features integrated into a solid Windows package that rivals PowerPoint. IBM has created a true presentation powerhouse.

Hollywood's import/export facility is much more versatile than PowerPoint's, and it is commensurate with Charisma's in graphics but less capable in text and data file handling. We rate Hollywood's import/export facility very good.

DOCUMENTATION:

To get you on the ground into the realm of Hollywood magic, you can dive into the 150-page installation and tutorial booklet. After that, you will want to refer to the 400-page reference manual. Both are clearly written, superbly organized, and well illustrated. A very nice touch is the added color that appears when Hollywood's color features are mentioned — these appear as full-color illustrations. Features, commands, and keyboard shortcuts are summarized on a quick reference card that is very useful, but could benefit from a few added drawings and perhaps an organizational chart.

Overall, the documentation is some of the best we have seen. It is clearly organized with a Table of Contents, a detailed index, a quick reference card, useful illustrations, and just about everything we need to get up and running. We rate documentation very good.

EASE OF LEARNING:

Like many Windows 3.0 packages, Hollywood assumes you are familiar with Windows' basics. All the dialog boxes, prompts, and other features, are standard Windows fare. The tutorial booklet is top-notch and uses good pedagogy to get you up to speed. Each section explains what you will learn, teaches you the concepts, and then summarizes what you've mastered. This is how all tutorials should be written. However, despite the predictability of the Windows interface and superior tutorials, we found Hollywood more difficult to learn than we expected — due to the program's wealth

of options. We suspect that you'll want to spend 8 to 10 hours just playing with the program and learning its organization. We rate ease of learning good.

EASE OF USE:

Installation: Hollywood installs easily from Windows in 5 minutes and requires from 8 to 12 megabytes of space on your hard disk. However, Hollywood isn't a program for occasional users, and we can't say that using it ever became very easy. Parts of the program seem needlessly complex — menus are complicated and sometimes unintuitive. However, the presentation mode is great, and it can be a knockout package if you have the time and dedication to master it. We rate ease of use good.

ERROR HANDLING:

Hollywood supports only a single level of undo and does not provide timely backups of your work (like Drawperfect, for example). Program or user errors are handled in a fine Windows fashion, by presenting dialog boxes with brief diagnostic messages. The reference manual is

exemplary in presenting a 25-page listing of error messages and explanations. The program worked well, and we encountered no unexpected error conditions. We rate error handling very good.

SUPPORT:

Support policies: With Hollywood, users receive unlimited toll-free support over an 800 number for Desktop software, from 9 a.m. to 8 p.m. Eastern time. After-hours support (24 hr) is also available toll-free on an emergency basis. IBM has also recently opened a support forum on CompuServe (GO IBMDESK). We rate Support Policies excellent.

Technical support: We made three calls to technical support. All but one of the technicians were extremely knowledgeable and able to answer our questions thoroughly and completely. The other technician was not as knowledgeable, but was able to research our questions and call us back in a timely manner. We rate technical support good.

VALUE:

Value: Hollywood (\$495) compares with PowerPoint (\$495) in its presentation emphasis and color handling, with Charisma in its technical prowess, and with Harvard Graphics 3.0 (\$595) in text charting. It may be the best of all worlds, but only if you plan to dedicate yourself to mastering it. Some reorganization and menu consolidation would go a long way in making Hollywood's sizable talents more accessible.

Overall, Hollywood impressed us. It is chock-full of features but missing PowerPoint's streamlined, intuitive design. We'd like to see more thought given to consolidating menus — several could be made hierarchical, eliminating the need for constant menu selections. As is, Hollywood is a presentation powerhouse, but only a needlessly difficult one. We rate value very good.

Just Write Takes on Professional Write Plus

Symantec's latest entrant in executive word processor arena is graceful, easy to use

BY JOHN LOMBARDI CONTRIBUTING EDITOR

In response to the opportunities of the Windows 3.0 environment, executive word processing programs have acquired new features, new capabilities, and a new look. First there was Ami, the younger sibling of Ami Professional, then came Professional Write Plus, and now we profile Symantec's JustWrite. This category of products gives up little to heavy hitters Microsoft Word for Windows or Lotus Ami Professional in the areas of text appearance and ease of use, although the executive programs lack the sophistication and extended features of the professional programs.

Most executive programs lack such features as full macro capabilities, fine adjustments to letter or line spacing, multiple forms of cross referencing, math, and sorting. Nonetheless, for general office correspondence, simple mass mailing projects, and general purpose newsletters or other documents, executive word processors often provide a viable solution at a reasonable price.

This review is based on criteria we used in our last executive word processor review. (See Professional Write Plus, May 13, page 87.)

PERFORMANCE:

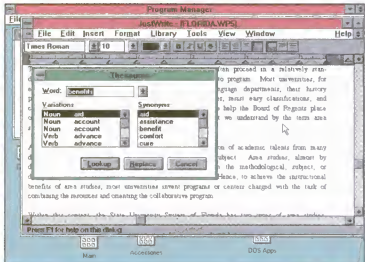
Basic editing: JustWrite handles all the basic editing tasks easily and effectively. The program has traditional cursor movement commands and includes a jump to page command in addition to an extensive bookmark system. Although you can cut and paste with ease, the program does not support rectangular blocks or column blocks for cutting and pasting, which is a disadvantage. JustWrite will automatically hyphenate your text in accordance with a hyphenation list, or you can have the program unhyphenate your text. You can set the hyphen hot zone and insert soft hyphens

manually, but when hyphenating automatically there is no option to confirm a hyphenation point. JustWrite has the usual justification options of full, left, right, and center as well as options for inserting a blank space before or after paragraphs. The program will space between lines in increments of half lines. Tabs include left, center, right, and decimal with optional dot or underline leaders.

In the sophisticated search and replace mode, the program will find and replace matching. Moreover, the program will find capitalization and replace with different or the same capitalization. The search and replace uses wild cards and can also find hard page breaks and tabs. The program supports no macros of its own, which is a serious disadvantage. However, JustWrite has about a dozen date, time, and file name documents, stamping options, and it can edit up to eight documents simultaneously in windows.

JustWrite has an extensive outlining system that includes collapsing levels. There are also complete style libraries and document templates, in addition to an index and table of contents facility. JustWrite also has endnotes or footnotes and headers and footers. Unlike Professional Write Plus, JustWrite does not have its own file system for deleting, moving, or managing files. The program does have a very simple table facility using rows and columns in spreadsheet style — a feature not available in Professional Write Plus. We rate basic editing excellent.

Proofing tools: JustWrite's spell checker works very well, is fairly quick, and offers reasonable suggestions. It permits all the usual options for adding to user dictionaries, skipping unrecognized words, entering corrections, and selecting corrections from a list. An advantage to JustWrite over Professional Write Plus is



JustWrite's thesaurus, though not as extensive as Professional Write Plus', offers synonyms and parts of speech.

that its spelling checker will check a user-entered correction before accepting it or offers additional suggestions if it is not found in the dictionary. The JustWrite thesaurus is less effective than Professional Write Plus[®] because there are no definitions, only synonyms and parts of speech. Unlike Professional Write Plus, JustWrite does not have an integrated grammar checker. We rate proofing tools very good.

Mail merge: The mail-merge function for handling form letters works easily. However, it can be thrown off by a bad record with an incorrect number of fields. JustWrite will pick field names from a list and automatically handle files prepared by dBase III/IV and Q&A 3.0 (Q&A 4.0 and Paradox will be added to this list.) With dBase and Q&A files you can automatically do a select and sort. However, when you use regular ASCII files or native JustWrite-prepared files,

there are no conditionals, selections, sorts, or other options. The mail merge will recognize an empty field and delete any white space. JustWrite's mail merge is not quite as strong as Professional Write Plus[®]. We rate mail merge satisfactory.

Fonts: JustWrite's font capabilities include everything normally available in Windows products, including multiple fonts, bold, underline, italics, super and subscripts, and full display of fonts on screen. Printer information comes from the Windows operating environment. We rate the fonts excellent.

Graphics: JustWrite uses frames for graphics. Frames can be any size, but contents will be cropped to fit inside page boundaries, thus frame contents cannot extend over more than one page

al. Professional Write Plus, Word for Windows, WordPerfect, WordStar, Xy-Write, DCA-RFT, and Microsoft's Rich Text Format. In addition, the file manager can identify many of these automatically and import them without user intervention.

JustWrite will save an imported file back into its native format, it will save it into a JustWrite format, or it will do both. The converter works about as well as we have seen. However, a glitch in the import filter hung the program when importing a large (130K) WordPerfect 5.1 file. This may be the result of something in the WordPerfect file, but it should not have produced an Unrecoverable Application Error. Other WordPerfect documents and exports of files of similar size caused us no problems. Because the problem

with reasonable examples and illustrations. Some material that appears in the tutorial introduction, especially merge activities in Windows, does not appear in the reference manual. The documentation does not address some issues. For example, it does not explain how to enter foreign language characters into a document. Sometimes the index is not entirely clear. On-line documentation follows standard Windows conventions and many dialog boxes have an in-context link to the help system. We rate documentation very good.

EASE OF LEARNING:

Most Windows products are easy to learn, and JustWrite is no exception. Users switching from other word processors will find some variations in usage, such as the location of functions for tabs and the operation of the ruler line confusing, but new users should adapt easily. The solid help system is an advantage. We found ease of learning comparable to Professional Write Plus. We rate it excellent.

EASE OF USE:

The absence of macros and the inability to change any characteristic of the keyboard inhibits customizing this product. Professional Write Plus, on the other hand, does offer some customization features. Multiple views and various ways of entering information into frames enhance ease of use. On balance, we rate ease of use very good.

ERROR HANDLING:

JustWrite includes timed backup, automatic backup, and warn for save features. You can retrieve a file as read-only to protect its contents. The program locks a file in use by another user or currently opened by the same user, but will then permit you to retrieve the file as a read-only file. The undo saves the last deletions at one level. Each subsequent cut or select-and-delete erases the previous deletion. We rate error handling satisfactory.

SUPPORT:

Support policies: Symantec offers a 60-day money-back guarantee for any reason. In addition, Symantec offers unlimited free technical support to registered users of JustWrite. Support hours are Monday through Friday from 6 a.m. to 5 p.m. Pacific time. Symantec also offers fax and BBS support. Support policies are very good.

Technical support: Our calls to the technical support staff produced a quick response with no waiting. In general, the technical support is capable, with the technicians able to answer all but the most difficult questions. We rate technical support satisfactory.

VALUE:

JustWrite: At \$199, is a strong product largely because of its outlining system and table editor. The spelling checker is also quite sophisticated. Professional Write Plus \$249, does offer a grammar checker, in addition to a better thesaurus. JustWrite's features and capabilities help make it a powerful executive word processor. We rate JustWrite a very good value. □

John Lombardi is president of a major university and author of five books. He has been working with computers since 1967.

Jeanne Stauffer of The Test Center contributed to this review.

REPORT CARD INFO WORLD

EXECUTIVE WORD PROCESSOR

JustWrite
VERSION 1.0



Criterion	(Weighting)	Score
Performance		
Basic editing	(125)	Excellent
Proofing tools	(125)	Very Good
Mail merge	(50)	Satisfactory
Fonts	(100)	Excellent
Graphics	(25)	Very Good
Compatibility	(75)	Very Good
Speed	(50)	Satisfactory
Documentation	(75)	Very Good
Ease of learning	(100)	Excellent
Ease of use	(125)	Very Good
Error handling	(75)	Satisfactory
Support		
Support policies	(25)	Very Good
Technical support	(25)	Satisfactory
Value	(25)	Very Good
Final score		7.8

PRODUCT SUMMARY

Company: Symantec Corp., 10201 Torre Ave., Cupertino, CA 95014-2132; (408) 253-9600.

List Price: \$199.

Requires: Intel 80286 or compatible; 2 megabytes of RAM; MS/PC-DOS 3.1, or 3.3 for PS/2, and Windows 3.x, one hard drive and one floppy disk drive.

Pros: Easy to learn; strong editing tools; powerful layout tools; complete outlining facility; strong import and export capabilities.

Cons: Relatively slow on functions and response to typing; limited graphics editing; no sorting; no macros.

Summary: JustWrite is a fine product that compares favorably to Professional Write Plus. While Professional Write Plus has a grammar checker and a better thesaurus, we found that JustWrite offers stronger basic editing and layout features with its collapsing outlining and simple table editor. JustWrite offers a strong alternative to Professional Write Plus.

JustWrite is a strong product largely because of its outlining system and table editor. The spelling checker is also quite sophisticated. Its features and capabilities help make it a powerful executive word processor.

or across more than one column. Graphic elements, imported from a wide range of file formats, can be cropped, scaled, made to fit a frame, and kept at the same ratio. They can't be rotated or edited, nor can you mix text and graphics in the same frame. You can nest frames up to four levels, and thus have a text frame inside a graphics frame. Graphic elements can use Dynamic Data Exchange (DDE) so a graph would reflect changes in linked spreadsheet data. Unlike Professional Write Plus, JustWrite has no line drawing or rotating capabilities. We rate JustWrite's graphics capabilities very good.

Compatibility: JustWrite supports a large number of word processor file formats including Ami, Ami Professional,

with this file may be a Windows problem rather than a JustWrite problem, we have kept JustWrite's score a very good.

Speed: Relative to Professional Write Plus, JustWrite is slower in almost every category we tested except cut and paste and append document to original document. In addition, JustWrite has very slow screen response. When typing, you can easily type ahead of the screen display and the updating of the screen appears jumpy. We rate speed satisfactory.

DOCUMENTATION:

JustWrite has two manuals: one that includes an introduction and tutorial with examples and the other that serves as a reference. There is also a quick-reference card. The manuals are well done, clear,

BENCHMARKS

INFO WORLD

Executive Word Processors

	Just Write [®] Version 1.0	Just Write Version 1.0	Professional Write Plus [®] Version 1.0
File*			
Load	0-04	0-04	0-03
Save	0-02	0-03	0-01
Import ASCII	0-06	0-05	0-02
Export ASCII	0-03	0-03	0-01
Import DCA/RFT	0-10	0-09	0-04
Cursor movement			
Top to bottom	0-02	0-02	0-03
Manual scroll [†]	0-02/0-13	0-06/0-20	0-09/0-13
Reformat	0-01	0-01	0-03
Search			
Last word	0-02	0-03	0-01
Global replace	0-01	<1	0-02
Append file	0-07	0-07	0-14

Times are in minutes:seconds; lower numbers indicate better performance.

*JustWrite has two modes: a draft mode and a detailed mode. The times in the first column are the default draft mode; the times in the second column are the detailed mode.

[†]Professional Write Plus was reviewed only in 3.1; page 07. The times shown are in minutes:seconds.

*File size is with a mouse; the second is using the cursor down arrow.

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NEW MINI DESKTOP 286 AND 386SX MODELS ARE BIG ON PERFORMANCE!

Sometimes the best things come in small packages. This saying definitely applies to Gateway 2000's spunky little 286 and 386SX computers. These systems now come in a space-saving mini desktop model that's sizzling with powerful new features.

The motherboard in the 286 and 386SX systems was custom-designed and manufactured for Gateway 2000 using ASICs (Application Specific Integrated Circuits) to create a cleaner, more reliable board. We integrated the floppy drive controller, the video chip set and the I/O card on the motherboard, to leave five 16-bit slots open in the standard configuration. Our mini desktop systems also have a standard mouse port

(PS/2 compatible), leaving two serial ports open.

The Gateway 2000 286 system operates at 16 MHz, rather than 12 MHz, for better performance. Our 386SX is available as a 16 MHz or a 20 MHz system. The 386SX-20 includes a 32K cache, which makes this system another truly outstanding Gateway price/performance.

HOT-PERFORMANCE 386 AND 486 SYSTEMS ARE IN ICY GRAY, CURVILINEAR MODELS

Although Gateway's 386 and 486 systems look entirely new, we limited changes on the inside to fine-tuning performance and reliability. In the Midwest, we firmly believe in the adage, "If it ain't broke, don't fix

it." And these award-winning, price/performance systems definitely did not need fixing.

All 386 and 486 systems include a fast and reliable IDE (Integrated Drive Electronics) hard drive with built-in cache. For added reliability and lower RF emissions, we've incorporated ASICs in the design of our motherboards whenever the change improved cost/performance. Because our 386 and 486 computers already include the fastest, most reliable video card on the market, the only way we could improve video performance was to increase the size of video RAM. So we did. All Gateway 2000 386 and 486 systems come standard with 1 MB video RAM. We also made our new Crystal Scan 1024NI color monitor standard with these systems. The 1024NI is non-interlaced, giving you a flicker-free video

16MHz 286 VGA

- 80286 Processor
- 2 MB RAM
- 1.2 MB 5.25" Drive
- 1.44 MB 3.5" Drive
- 40 MB 17ms IDE Drive with 32K Cache
- 16-Bit VGA with 512K
- 14" Crystal Scan 1024 Color VGA Monitor
- 1 Parallel/2 Serial Ports
- 1 PS/2 Mouse Port
- 124-Key AnyKey™ Keyboard
- MS DOS™ 5.0

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16MHz 386SX VGA

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- 2 MB RAM
- 1.2 MB 5.25" Drive
- 1.44 MB 3.5" Drive
- 40 MB 17ms IDE Drive with 32K Cache
- 16-Bit VGA with 512K
- 14" Crystal Scan 1024 Color VGA Monitor
- 1 Parallel/2 Serial Ports
- 1 PS/2 Mouse Port
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- Microsoft® Mouse
- MS DOS 5.0
- MS Windows™ 3.0

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- 4 MB RAM
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- 1.44 MB 3.5" Drive
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- 16-Bit VGA with 512K
- 14" Crystal Scan 1024 Color VGA Monitor
- 1 Parallel/2 Serial Ports
- 1 PS/2 Mouse Port
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS DOS 5.0
- MS Windows 3.0

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25MHz 386 VGA

- Intel 80386 Processor
- 4 MB RAM
- 1.2 MB 5.25" Drive
- 1.44 MB 3.5" Drive
- 80 MB 17ms IDE Drive with 32K Cache
- 16-Bit VGA with 1 MB
- 14" Crystal Scan 1024NI Color VGA Monitor
- 1 Parallel/2 Serial Ports
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS DOS 5.0
- MS Windows 3.0

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33MHz 386 CACHE

- Intel 80386 Processor
- 64K Cache RAM
- 4 MB RAM
- 1.2 MB 5.25" Drive
- 1.44 MB 3.5" Drive
- 200 MB 15ms IDE Drive with 64K Multi-Segmented Cache
- 16-Bit VGA with 1 MB
- 14" Crystal Scan 1024NI Color VGA Monitor
- 1 Parallel/2 Serial Ports
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS DOS 5.0
- MS Windows 3.0

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display with up to 1024 x 768 resolution.

When our 25 MHz 486 dropped below \$4,000, it was the hottest value going in high-end technology. Now Gateway's new 33 MHz 486 - fully loaded - is priced at \$3,995! You'd be hard pressed to find a loaded 386 for this price anywhere else. With either 486 system, you get Intel's 486 processor with built-in math coprocessor and 8K cache.

INTRODUCING THE AWESOME ANYKEY™

We call our new 124-key programmable keyboard the AnyKey because any key can be programmed to perform any function - anything you can imagine, quickly and easily. Or you can

remap the keys to create own keyboard layout. It's a revolutionary new concept designed to let you talk to your personal computer in a very personal way.



The AnyKey includes a numeric pad and a separate, full-function cursor pad with diagonal keys, plus two sets of function keys located along the top and left side. The AnyKey's versatility is rivaled only by its simplicity. You can learn to program it in minutes. The AnyKey keyboard is standard with all Gateway 2000 computer systems.

25MHz 486 CACHE

- Intel 80486 Processor
- 64K Cache RAM
- 4 MB RAM
- 1.2 MB 5.25" Drive
- 1.44 MB 3.5" Drive
- 200 MB 15ms IDE Drive with 64K Multi-Segmented Cache
- 16-Bit VGA with 1 MB
- 14" Crystal Scan 1024NI
- Color VGA Monitor
- 1 Parallel/2 Serial Ports
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS DOS 5.0
- MS Windows 3.0

\$3495

33MHz 486 CACHE

- Intel 80486 Processor
- 64K Cache RAM
- 8 MB RAM, Expands to 64 MB
- 1.2 MB 5.25" Drive
- 1.44 MB 3.5" Drive
- 200 MB 15ms IDE Drive with 64K Multi-Segmented Cache
- 16-Bit VGA with 1 MB
- 14" Crystal Scan 1024NI
- Color VGA Monitor
- 1 Parallel/2 Serial Ports
- 124-Key AnyKey Keyboard
- Microsoft Mouse
- MS DOS 5.0
- MS Windows 3.0

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BEST BUYS

- Get our 33 MHz 386 Cache system, same configuration as listed, with a 120 MB IDE hard drive instead of the 200 MB drive.

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- Same features as our 33 MHz 486 Cache system except this machine has 4 MB RAM, instead of 8, and a 120 MB IDE hard drive, instead of the 200 MB drive in our standard configuration.

\$3445

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Possibly the most dramatic news about our new product line is price. When a manufacturer introduces a new product line, you expect to see an eruption of price hikes. But then you've come to know Gateway is not like most manufacturers. Prices on systems in our new line are better than ever. And that goes for quality and service too, making the hottest value in the industry even hotter.

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LOOKING AHEAD

The introduction of our new product line represents almost a year of design and engineering. But it's just one phase in a process of continuous improvement that we employ at Gateway. Each day, Gateway 2000 employees come to work with one primary goal in mind: to provide you with better prices, performance, quality and service. We're committed to making Gateway 2000 the only logical choice in microcomputers.

We'd like to thank our customers for their valuable contributions to the redesign of our product line. It was our customers' suggestions and comments that gave us our direction.



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IBM PS/2 Model L40SX is a strong performer, expandable

Big Blue's computer has many features of a larger laptop, compares with notebook systems

BY ROD CHAPIN TEST CENTER

IBM's very expandable new PS/2 Model L40SX has several impressive features. IBM calls the machine a laptop, and it shares many of the advantages that larger laptops have, such as a large

display and keyboard and impressive expandability options, but it is also comparable to notebook computers. (IBM plans to release its notebook later this year.) We compare the laptop in speed to two 20-MHz 386SX systems we tested recently: The AST Premium Exec

and the AT&T Safari. (See product comparison recap, June 24, page S74 and product comparison May 20, page 147.)

The system's 18-megabyte RAM capacity is the highest in its class. This coupled with its 60-megabyte standard hard drive and 20-MHz 386SX processor make it a strong contender.

An interesting feature to this unusual system is beginning to show up on high-end portables: a graphic LCD system status display. This innovative feature gives the status of everything from the battery to disk drive usage—it even has a temperature indicator.

The IBM ran our CPU-intensive speed tests in 1 hour, 4 minutes, and 5 seconds. This speed was slightly slower than the results of these tests for the AST Premium Exec and the AT&T Safari but much faster than other comparable portables on the market.

The IBM finished our disk-intensive tests in 1 hour, 4 minutes, and 15 seconds, which is very fast compared with other portables.

The IBM ran our Windows test—which uses Microsoft Excel 3.0—in 1 minute and 45 seconds. This time is comparable to AST's and the AT&T's.

We encountered one minor problem running Windows 3.0 with HIMEM.SYS loaded. The system would repeatedly lock up. This was solved by adding the parameter HIMEM.SYS=NOC. This parameter is specifically designed to be used when running HIMEM.SYS on an IBM PS/2 system.

The IBM's size of 10.7 inches by 12.8 inches by 2.1 inches tolerates a large screen and full-size keyboard. The weight is mid-range compared with notebook computers, but low for a laptop at 7 pounds, 14½ ounces without the power

supply and 9 pounds, 7 ounces with the power supply.

On our battery life tests, the L40 went 1 hour, 42 minutes, and 25 seconds, which is less time than many notebooks but a longer time than many laptops post.

The L40 comes with the standard assortment of power saving features, including screen and disk drive timeouts and a standby mode that can be set to timeout after a specified period of inactivity.

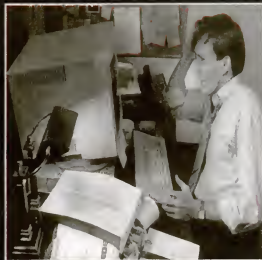
The L40 comes with a standard 60-megabyte drive, giving it an advantage over most comparable-size portables. The unit also comes standard with 2 megabytes of RAM, expandable to a whopping 18 megabytes—much better expandability than notebook systems offer. Finally, there is a 1.4-megabyte internal 3½-inch floppy drive, which gives the IBM a lot of capacity.

The sidelit VGA LCD display offers 640-by-480 resolution in graphics mode and 640 by 400 in text mode. It will display 32 shades of gray. The size—8 inches wide by 6 inches high and 10 inches diagonal—makes the L40 one of the larger screens in its class. We found



The IBM PS/2 Model L40 SX has a 60-megabyte hard drive standard; RAM is expandable to 18 megabytes.

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BENCHMARKS

20-MHz 386SX Laptops/Notebooks

	IBM L40SX Laptop	AST Premium Exec	AT&T Safari
Battery life	1:42:25	2:33:33	3:56:33
Speed scores			
CPU-intensive speed	1:04:05	0:58:47	1:03:32
Disk-intensive speed	1:04:15	1:01:32	1:10:10*
Windows tests	0:01:45	0:01:34	0:01:47
dBase III Plus	0:32:21	0:31:43	0:34:51
dBase IV 1.1	0:17:39	0:16:06	0:18:51
Lotus 1-2-3 2.2	0:25:29	0:24:11	0:24:47
Lotus 1-2-3 3.0	0:36:46	0:32:53	0:36:52
WordPerfect 5.5	0:01:50	0:01:43	0:01:53
Paradox	0:14:15	0:13:43	0:16:28

*All times in hours/minutes/seconds. Lower numbers indicate better performance in speed scores.

*We previously reported the Safari's disk-intensive speed time incorrectly as 0:53:42 (see product comparison June 24, page S79). The Safari's updated time, reported here, still qualifies for an excellent speed score. InfoWorld regrets the error.

**INFO
WORLD**

the screen to be quite clear head but with excessive blurring at angles.

The keyboard is close to full size but very flat — not a usual feature for large-scale keyboards. The key travel is very short, similar to the Compaq LTE and has a very strong click. The key placement

is very good, with isolated arrow keys in an inverted "T" configuration. The function keys are also isolated and equal to the size of the other keys. The other cursor keys such as page up/down are all separate. And all the keys that should be double size are.

DOCUMENTATION:

The only documentation the L405X came with is a quick-reference guide. This is inadequate for a notebook that is more complicated than a desktop system. The short guide covers the basics.

EASE OF USE:

With its sophisticated status display, most of the information the user needs is available at a glance. The battery status indicator is especially useful, telling what remains in the battery and when it's through charging.

The only drawback with the panel is remembering what all the icons stand for. This is not an easy task when you are confronted with so many indicators. Adding to this disorientation is the fact that the indicators, when not in use, are dark, with no indication of which is which until it is displayed. So if users are looking

**With its
sophisticated
status displays,
most information
is available
at a glance.**

for specific information, they may not know where to look. A speed switch, which IBM calls an economy switch, allows the machine to run at a fixed speed or to automatically drop down when the computer is idle to save power. The floppy drive is located on the side rear and is inset, making it difficult to find the floppy release button.

SERVICEABILITY:

The machine's molded design is not streamlined. With its abrupt lines and bulky frame, the unit is far from appealing. The plastic makes it a sturdy unit, and its peripheral covers have well-designed latches. The screen and power controls are well placed and easy to adjust.

IBM offers dealer support which will be referenced via a toll-free number, but a customer help line is available around the clock. The system comes with a one-year warranty.

IBM's warranty service results have shown IBM's technical support to be good.

VALUE:

The IBM is high-priced at \$5,995, but the system comes with unique extras such as a standard 60-megabyte hard drive, a numeric keypad, and bundled software. The AT&T Safari, which comes standard with a 40-megabyte hard drive, 2 megabytes of RAM, and Microsoft Windows is less expensive at \$5,399. The AST Premium Exec, which comes standard with a 40-megabyte hard drive and 2 megabytes of RAM is much less expensive at \$3,395. The IBM, however, offers much more RAM expandability than those two systems. We were impressed with this laptop.

REVIEW RESPONSES

In defense of Personal RBase

I felt your April 15 review of Personal RBase (page 68) was in many ways incorrect and misleading.

Forms creation was criticized as "a one-at-a-time, hunt-and-peck chore," but forms creation was described as "crisp and uncluttered, a pleasure to use." They both use an identical approach to locating data elements, so I am puzzled about how the conclusions could be so different.

RBase's dBase connectivity far exceeds a simple import capability, your only mention of it. RBase's SuperMath features provide extensive functionality without requiring scripts or programs. Yet you chose to focus on the fact that RBase doesn't provide a Recount function.

I don't understand what a "report with two-pass aggregates" is. Personal RBase provides for single-pass reports with up to 10 break levels. A true two-pass report process would require programming and creation of intermediate tables, which is beyond the scope of Personal RBase. Was the table properly indexed? I doubt it, considering the time discrepancy between the straight report and the two aggregate runs.

The support comments were extremely misleading. When you call Micromin technical support, you're advised of the number of people on hold and the approximate wait time and asked if you would like to be called back. I use this option frequently and have never experienced a problem. The real question is: Was the support received helpful and correct? You say it was not. Personal RBase's final score of poor for value is based on incorrect observations and conclusions. Isn't Personal RBase an extremely useful product when its price and performance are compared with competing products?

John Ehlers
RiverSide, CT

Our two-pass aggregate report takes an average of all prices in the database, compares this to the price in each record, and yields a ratio (for instance, 120 percent of the average). You are correct in saying Personal RBase cannot automatically produce such a report; we had to use two reports to achieve the final result. This should have been explained in a footnote.

We did not index the tables. Regardless, different reports were used for each test, so one cannot adequately compare the benchmark results for the simple and multiple-aggregate reports.

Though the actual support for a product may be quite acceptable, we lower the score if we have too much trouble getting through. We rated Personal RBase's value poor because no product, particularly a "personal" database designed for beginners, should lose data. Micromin says it has fixed the bug. (We shall review Personal RBase again in our comparison of nonprogrammable databases, July 15.) — Editors.

InfoWorld welcomes comments about its reviews. Letters are subject to editing for space and clarity. Please address correspondence to: The Reviews Editor, InfoWorld, 1060 Marsh Road, Menlo Park, CA 94025.

InfoWorld Guide to Reviews

REVIEW SCORING

InfoWorld reviews only finished, production versions of products, never beta-test versions.

Products receive ratings ranging from unacceptable to excellent in various categories. Scores are derived by multiplying the weighting (in parentheses) of each criterion by its rating, where:

Excellent = 1.0 — Outstanding in all areas.

Very Good = 0.75 — Meets all essential criteria and offers significant advantages.

Good = 0.625 — Meets essential criteria and includes some special features.

Satisfactory = 0.5 — Meets essential criteria.

Poor = 0.25 — Falls short in essential areas.

Unacceptable or N/A = 0.0 — Falls to meet minimum standards or lacks this feature.

Scores are summed, divided by 100, and rounded down to one decimal place to yield the final score out of a maximum possible score of 10 (plus bonus). Products rated within 0.2 points of one another offer little. Weightings represent average relative importance to InfoWorld readers involved in purchasing and using that product category.

You can customize the report card to your company's needs by using your own weightings to calculate the final score.

Average score for all products reviewed in 1990: 6.8.

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InfoWorld publishes each year in-depth reviews and product comparisons of approximately 1,000 microcomputer products that we judge to be important, interesting, and useful to our readers.

To submit a product for review consideration, send product announcements, marketing materials, demos, or advertising copy describing the product to: Reviews Editor, InfoWorld, 1060 Marsh Road, Menlo Park, CA 94025. (Send news and new product announcements separately to News Editor.) Please do not send hardware. Unsolicited materials are not returned.

The editorial review board selects products for review for each cycle. If your product is selected, you will be contacted to arrange shipment of the product for review. We request two copies of software; we return hardware, but not software, after review.

Because of the volume of submissions, we regret we are unable to contact vendors regarding products not selected for review.

REPORT CARD INFO WORLD

LAPTOP COMPUTER

IBM PS/2 Model L405X Laptop

Criterion	(Weighting)	Score
Performance		
CPU speed	(100)	Excellent
Disk speed	(100)	Very Good
Windows test	(50)	Excellent
Software compatibility	(50)	Very Good
Size/weight	(75)	Satisfactory
Battery life	(75)	Satisfactory
Capacity	(50)	Excellent
Screen readability	(75)	Good
Keyboard	(50)	Very Good
Documentation	(50)	Poor
Ease of use	(50)	Very Good
Serviceability		
System design	(50)	Satisfactory
Support policies	(50)	Satisfactory
Technical support	(25)	Good
Value	(150)	Satisfactory
Final score		6.6

PRODUCT SUMMARY

Company: IBM Corp., U.S. Marketing & Service, 1133 Westchester Ave., White Plains, NY 10604; (800) IBM-2458.

List Price: \$5,995.

Features: 80386SX 20-MHz CPU; one serial port; one parallel port; one VGA external monitor port; one PS/2 mouse port; macro processor slot; VGA 640-by-480 (640-by-400 text) screen, 32 gray-scale screen.

Peripherals: Internal 9,600-bit-per-second (bps) fax/2,400-bps modem; second serial port; macro processor support; trackpoint pointing device; car charger; carrying case.

Storage and Memory: 2 megabytes of RAM standard, expandable to 18; 60-megabyte hard drive standard; 1.4-megabyte floppy drive.

Pros: System status panel; 18-megabyte expandability.

Cons: Bulky, unappealing unit; inadequate documentation.

Summary: Though expensive, this is an extremely expandable and powerful system, with strong performance.



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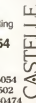
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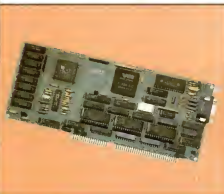
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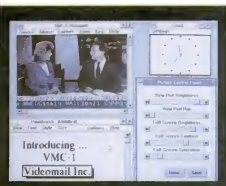
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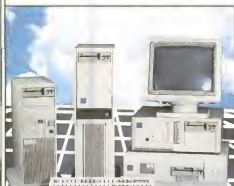


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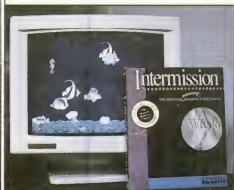
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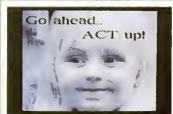
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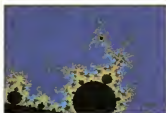
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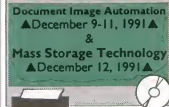
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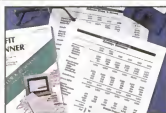


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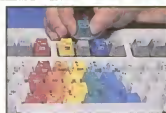
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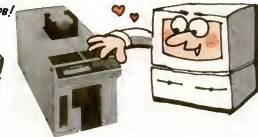
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NOTEBOOKS / from page 1

Notebook-size computers suffer from poor construction

briefcase. Outside, the casing is intact; inside, the components are damaged," he said.

InfoWorld's Test Center found that the port doors on a TI Travelmate 2000 popped out constantly.

A Los Angeles-based dealer also reported problems with the construction of the Sharp machine, including cracked hinges on the display case. But he said it was a common problem, and he'd seen many notebook computers — particularly inexpensive clones sold by tiny firms — returned because of cracked hinges.

A Texas Instruments spokeswoman was unaware of prob-

lems with the Travelmate 2000, and was unable to comment. Sharp was unavailable for comment on the reported difficulties.

Compaq is no stranger to problems with cracked cases. Its LTE and LTE 286 models suffered so badly from cracked cases that one corporate computer buyer said he returned 250 cases on the first 200 machines his company bought.

"The first cracks would appear around the diskette drive, followed by hinges, joints, thin sections — everywhere. In time, the unit of a frequent traveler would self-destruct. Users were advised to be gentle and use tape

to hold their units together."

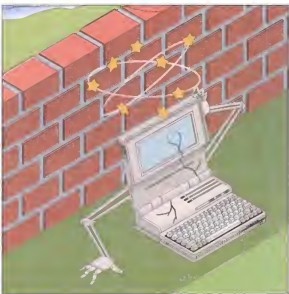
Compaq Computer Corp. has subsequently offered to replace the cases for free, and a spokesman for the company said they had taken care of the problem on its 386s/20 models.

"Compaq was real good (about replacing the cracked cases)," said Jeff Gardiner, systems specialist at Nissan Motor Corp. U.S.A. "They just swapped them out, with no questions asked."

Still, a few of the 386SX machines — including one received by *InfoWorld's* Test Center earlier this year — quickly developed cracks in their cases. However, two computer dealers said they'd sold about 50 LTE 386s/20 computers apiece and had no problems with cracks.

A Compaq official acknowledged it's difficult to build lightweight notebook-size computers that can withstand rugged handling.

"The original Compaq portable had a Winchester drive mounted to rubber bumpers," he said. "You don't have the same shock absorbing materials, dampers, etc., in notebooks."



Resource Workshop to compete with Visual Basic

BY STUART J. JOHNSON

Borland will announce next week a visual programming tool for Windows for use with both its own languages and those of its rival — Microsoft.

Meanwhile, Borland executives have been working behind the scenes to promote the new tool — Resource Workshop — as a direct competitor to Microsoft's Visual Basic.

"Resource Workshop is a high-performance tool for visually building Windows user interfaces, and it also provides new graphical controls," said Eugene Wang, vice president of languages for Scotts Valley, California-based Borland.

"Visual Basic has 16 tools on its palette — we have 28 and also better performance," Wang added.

Set to ship in the third quarter, the package includes a

complete set of editors and tools that let a developer build Windows "resources," such as dialog boxes and radio buttons and then compile them, said Paul Gross, Borland's group product manager for C++.

Resource Workshop will work with both Turbo Pascal for Windows and Borland C++ 2.0, as well as the versions of the ObjectWindows Library (OWL), which is an application framework of Windows object classes, Gross said.

In addition, it will work with "any Microsoft language that supports Windows except Visual Basic," he said.

An important feature of the package is its dynamic message dispatching, a mechanism that lets programmers treat resources as callable objects.

Borland will also continue to offer the Whitewater Resource Toolkit.

MICROSOFT / from page 1

Company drops OS/2 from Windows New Technology

they called "Advanced Windows."

"Rather than calling it Advanced Windows, we're calling it Windows NT," Ballmer said. "We will introduce a new high-end [operating] mode for Windows called NT mode [that will only run under the NT kernel]."

Currently Windows runs in three modes — real, standard, and enhanced.

"NT mode brings us security, 32-bit internals, etc.," Ballmer said. These features ostensibly include the other capabilities promised for OS/2 3.0 — such as asymmetrical multitasking.

The company also plans to

Apple's protocol links nets over IP

Is proposed as Internet standard

BY KARYL SCOTT

Apple Computer Inc. has developed a new networking routing protocol it hopes will become the de facto industry standard for linking AppleTalk networks over IP (Internet Protocol) links.

The Routing Table Maintenance Protocol is being proposed as an Internet standard and is currently listed as a proposed standard within the Internet Engineering Task Force. The Internet is the federal government's international network connecting government research facilities, universities and other research institutions. The IETF is the standards-setting body for the Internet.

The inclusion of RTMP as an Internet standard will mean that in addition to Apple, vendors such as Cayman Systems Inc., Shiva Corp., Novell Inc. and Cisco Systems Corp. will imple-

ment the standard in their routers and gateways.

The creation of this routing technology indicates growing acceptance of the Macintosh in research and engineering environments that are heavy users of IP networking. It also signals a trend toward larger AppleTalk internetworks. Some prototype products based on RTMP are expected to be shown at the Interop Conference in San Jose this October and finished products could be forthcoming at Mac World Expo, in Boston in January, said an Apple official.

RTMP encapsulates AppleTalk datagrams or packets and allows them to be "tunneled" through IP links. In this way, two AppleTalk LANs can be linked over an internetwork. The specification will also allow network administrators to control access to network zones and services.

provide a future 32-bit Windows API in enhanced mode under DOS, Ballmer said. Though it will boot under DOS, that version will actually bypass DOS except when the user runs DOS applications, allowing Microsoft to provide a version of OS/2's High Performance File System, sources said.

Software development kits (SDKs) for Windows NT will ship this year, and commercial end-user release will be sometime next year, Ballmer said.

However, the company has an aggressive schedule that aims for SDKs to ship in September and commercial release in the

first half of 1992, sources said. Ballmer did not challenge the assertion.

Windows NT's user interface will include the functionality in Windows 3.1 — an upgrade to DOS/Windows that is scheduled to appear later this year.

The company has not yet decided whether Windows NT will be sold separately or be packaged in the same box as DOS/Windows, Ballmer said.

The company is also working on a further refinement that executives sometimes refer to as Windows 4.0, which will add other new features, Ballmer said.

IBM-Apple deal spurs Microsoft into action

IBM's aggressive OS/2 2.0 campaign and last week's IBM-Apple announcement may push Microsoft engineers into hyperdrive to deliver their competing Windows NT (New Technology) product. (See accompanying story).

"I know [Microsoft executives] are getting really aggressive with Windows NT because of the IBM-Apple deal [but Windows NT] is on crutches at best," said a source close to the company.

IBM has also been touting OS/2 2.0, due for release by year end, as a "better Windows than Windows" and giving dazzling demos that have some enthusiastic about its future.

Microsoft has to be afraid that OS/2 2.0 will be a good product," said another source.

The recent IBM moves may also be behind Microsoft's decision to go public with its plans

for 32-bit Windows, running on top of its New Technology kernel, which it now calls Windows NT.

Microsoft is demonstrating Windows NT to select ISVs, sources said.

Such a move may be an attempt by Microsoft to pre-empt IBM by preannouncing products and quietly giving customers and ISVs an overoptimistic delivery date, while publicly committing to a more conservative schedule, sources speculated.

"Remember that Microsoft always tries to take the steam out of other peoples' announcements by saying they own a market before they do," said one source.

"Microsoft is going to try to create a lot of uncertainties in the marketplace," added another source.

Autodesk reorganizes, forms five business units

BY MARK STEPHENS

Autodesk Inc., which started in 1982 as a programmer's cooperative dedicated to tapping what its founder called the PC software business: "cosmic money gusher," has reorganized its corporate structure. The maker of AutoCAD, the No. 1 computer aided design design package, is now split into five business units, each led by a general manager charged with keeping the money gushing.

Independent business units are already used by other software companies, including Borland International Inc. and Microsoft Corp.

"We're just speeding things up, getting back to the Autodesk everyone remembers," said Michael Davies, former vice president of marketing and sales and now executive vice president of the Sausalito, California, company. "By the time you realize you are behind, you usually have to move very quickly. By restructuring now, we can do it while we still have plenty of room."

Davies, along with Autodesk CEO Alvar Green, will oversee the new business units, leading a small corporate staff.

Hardly on the ropes, Autodesk reported \$237 million in sales for its 1991 fiscal year and \$56 million in profits. The company has more than \$150 million in cash and controls 70 percent of the CAD software market.

The five new business units are AutoCAD, Retail Products, Multimedia, Molecular Modeling, and Information. No jobs will be lost in the restructuring.

Autodesk's European opera-

tions and its multimedia unit were already organized as business units. The new reorganization is bringing the rest of the company into line.

"We'll probably make a few changes in this organization, too, fine-tuning as we see how it works," Davies said.

General manager will have profit and loss responsibility, though not all units will be held to the same profitability goals. The Information business unit, for example, is primarily responsible for Xanadu, a hypertext product that has been a long-term effort for Autodesk with little sales return so far. Xanadu will continue to be a strategic technology for the company, according to spokesman Andrew Zarillo.

Impetus for the restructuring came, in part, in a 43-page memo from Autodesk founder John Walker, worrying about circumstances that might lead to the company's demise. But where Walker saw danger, current management saw mainly opportunity.

"We're going to be much more aggressive," Davies said. "We intend to revolutionize the CAD business, but that requires pushing authority and responsibility down in the organization so we can move quicker. We've reached only 25 percent saturation in our core market of professional and technical users. There is lots of room to grow."

The reorganization is a good move for Autodesk," said Rick Ruvkin, analyst for Morgan-Stanley. "It's an obvious promotion for Malcolm Davies and for Ruth Connolly, head of the AutoCAD unit. She's a fast-rising star."

FTC adds Intel to its list

Chip maker receives notice of antitrust investigation

BY TOM QUINLAN

Intel Corp. has joined the ranks of dominant computer industry companies being scrutinized by the Federal Trade Commission.

The maker of the 386 and 486 chips recently received official notification of an FTC investigation, along with a request for documents.

Earlier this year, Microsoft Corp. received a similar notification, and the FTC is investigating the software company for possible violation of antitrust rules.

So far, Intel officials said the FTC has not indicated the scope of the investigation, and FTC officials could not be reached for comment.

Despite systems manufacturers' complaints about Intel's refusal to second source its 386 and 486 microprocessors to other chip makers, most believe Intel is innocent of any antitrust violations.

Even Compaq Computer Corp. president Rod Canion, whose company has been sharp-

ly critical of Intel's chip policies — and the fact that Intel is building its own systems — recently praised the company for being much more responsive to its customers lately.

"We've seen no indication of unfair practices by Intel," said Gary Held, president of Northgate Computer Systems. Although Northgate uses AMD's 386 clones in some systems, "we've never had a problem with Intel because of that," he said.

Indeed, Intel recently changed its chip allocation procedures to account for vendors using Advanced Micro Devices 386 clone, some vendors noted. Now Intel counts all 386- and 486-based systems sold by a manufacturer — not just the number of Intel products sold — to determine how many processors to deliver to a company.

By press time, no computer manufacturers acknowledged being contacted by the FTC in this investigation.

Two companies that have publicly indicated they have

been contacted by the FTC, math coprocessor developers Cyrix and Cobra, have recently been involved in legal action with Intel.

Cyrix, in fact, sued Intel last year. The company alleged that Intel had violated antitrust rules when it circulated a white paper claiming that third-party math coprocessors were not fully compatible with Intel's products.

Intel also recently cut the prices of its coprocessor chips, in some cases by as much as 70 percent. That move fueled speculation its actions with coprocessors have prompted the FTC investigation.

Observers expect that the Intel investigation will be relatively brief and uneventful, however.

"For years Intel has been indoctrinating its employees as to what are and are not acceptable marketing practices from an antitrust point of view," said Millard Phelps, a semiconductor analyst for the financial services firm Hambrecht & Quist.

DCA sells 10Net communications division to Tiara

BY DAVID COURSEY

Digital Communications Associates Inc. pulled the plug on its local area network operating system business last week, selling its 10Net communications division to Tiara Computer Systems Inc. for \$2.5 million and a 10 percent equity stake.

DCA paid \$11.1 million for 10Net in 1987, but failed to turn significant profits. A source close to the Tiara sale said 10Net had about \$10 million in revenue

last year and was only marginally profitable.

Still, it was Tiara that selected 10Net, said CEO Andrei Glasberg. The company wanted to expand its LAN business, today primarily focused on ARCnet and Ethernet interface cards.

"10Net was the first peer-to-peer LAN on the market," said Glasberg, who believes the product will be a good match for his company's end-user customers, primarily small- and medium-

size businesses.

While 10Net may have been suffered some "neglect" under its former owner, Glasberg said his company is a closer match for the 10Net products than DCA. The two businesses share the same strategy of distribution through wholesalers and value-added resellers, according to Glasberg.

10Net will remain headquartered in Dayton, Ohio, and its 23 employees will move to Tiara with the product line.

Ashton-Tate moving workers to Bay Area

Ashton-Tate is quietly moving several divisions up to the Bay Area, according to sources close to the company. Already, several marketing departments are moving northward to the company's Los Angeles, California, facility. Ultimately, even the dBase development team will be moved from Southern California, sources said. However, because the company has several long-term leases, the moves will happen incrementally.

— Rachel Parker

WordTech buys rights to Paperback's software

WordTech Systems, publisher of the dBase database-compatible database system, acquired the rights to VP Expert and VP Graphics from Paperback Software. While terms of the cash deal were not disclosed, WordTech said it took over certain liabilities, hired three of Paperback's VP Expert marketing people, and

took over the contractual agreements with the developers of the products for future releases.

WordTech plans to incorporate VP Expert's artificial intelligence features into future releases of Erago, giving it a rule-based query engine, according to Surinder Brar, vice president of marketing and sales for WordTech.

— Rachel Parker

Symantec plans 2-for-1 stock split in October

Symantec Corp. announced it plans to issue a two-for-one stock split. The plan must be approved by Symantec's shareholders by its annual meeting, scheduled for October 3. If the split is approved, shareholders will receive one additional share for each share held as of August 5. The split will increase Symantec's outstanding shares to 19.6 million shares.

— Rachel Parker

CLOSE OF BUSINESS

Microsoft promotes Allchin to Windows VP

Microsoft Corp. announced the promotion of James Allchin to vice president of advanced Windows services. He will report to Steve Ballmer, senior vice president of systems software. Microsoft also announced the appointment of Paul Leach as director of future systems, which will develop a distributed Windows architecture. Leach was founder of Apollo Computer and chief architect of the Apollo Network Computing System.

— Karyl Scott

Ashton-Tate will sell through superstores

Ashton-Tate last week formed a consumer sales division to sell certain titles through mass-market outlets. The division will offer its easy-to-use programs, including RapidFile (\$149), Control

Room (\$129), and Framework XE (\$149), through Best Buy Co., Walden Software, Lechmere, Electronics Boutique, and Software Etc., among others. Pricing and packaging are being redesigned to appeal to the new channel, according to a company spokeswoman. Ashton-Tate decided to create the new division to tap the growing home office and small business marketplace that shops through discount outlets, the spokeswoman said.

— Rachel Parker

Network General will buy WAN tool maker

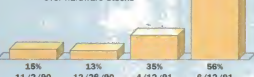
Network General Corp. announced plans to acquire Progressive Computing Inc., of Oak Brook, Illinois, maker of wide area network diagnostic tools. The Menlo Park, California-based NGC will exchange 1 million registered shares of its stock for outstanding PCI stock. The move will help NGC serve enterprise networking customers.

— Karyl Scott

Software beats hardware

InfoWorld 40 software companies outperform hardware companies since 6/90

Numbers reflect the percentage that software stocks performed over hardware stocks



See graph on page 106 for explanation of InfoWorld 40

SOURCE: ITC INC

TECH STREET / John Gantz

Software stocks ride rising tide; 45 percent increase

No one used to want to invest in software companies. Their assets walked out the door at night. There were no lathes or drill presses, no million-dollar chip-making machines to repossess if things went south. The few hardy software companies that went public did so in a quiet and unassuming way.

Then Lotus Development Corp. came along. When it went public in October 1983, it did so at a crazy price/earnings ratio over 150. ValueLine called it overpriced (and so did I). But then the stock shot up to \$40. Lotus blew past the \$100 million revenue mark in the next quarter, and investors got rich.

In the latter half of the 1980s the baton switched to Microsoft, whose stock last month split (3-2), the third split since opening day on March 13, 1986. Had those splits not occurred, Microsoft would sell at \$672.

Now investors see that although there's not much "brick and mortar" to go along with an investment in a software company, there may be more — a vehicle for obtaining proprietary advantage in an increasingly commoditized market, and often, the software sells the iron.

Software stocks in the InfoWorld 40 index have outperformed the index as a whole, rising higher than the April peak, and falling back less since then. The comparison to hardware is even more dramatic: Software stocks are selling 45 percent ahead of where they were a year ago; hardware stocks are 11 percent lower.

Although Microsoft's 50 percent gain in stock value from June 1990 to June of this year is impressive, it's by no means the largest gain. That honor goes to Borland, up over 150 percent, followed by Novell, up over 100

percent. Other companies moving up faster than Microsoft are Aldus (up over 75 percent) and Symantec (up over 70 percent).

There are two things going on here. The first is a general bull market; software stocks are riding a rising tide.

The second has to do with monopolies. Not big monopolies, but little monopolies. In the hardware business, the only real edge vendors have over their competition is the speed with which they can bring new technology into their products. You carve out a dominant role in floppy disks (Tandon) and prosper for a while, but then someone (Seagate) comes along and carves out a dominant role in a successor technology, one-quarter-inch hard drives. Sooner or later another vendor takes over with a new technology, like 2½-inch hard drives (Conner). And so it goes.

Not so with software. Each of the software companies on our list is either dominant in a particular niche or has lost ground because it isn't. Borland has cornered the language and Lotus-clone market; Aldus has the desktop page composition market; Microsoft has the operating system market; Symantec has the utility and database market, and so on. The barriers to entry in the business are low, and addressing small market niches is possible. When one of those niches explodes — as did, say, the spreadsheet market — the dominant player rises to prominence. It might even go public.

John Gantz is editor of Tech Street Journal, which covers the high-tech stock market and business performance. The views expressed are his own.

FROM THE BULL PEN / David Coursey

Tandy to finally snare corporate America

The only surprise in Tandy's recent decision to close its nearly 200 Radio Shack Computer Centers was that it did not happen at least two years ago.

In some ways, the stores — which began opening at the dawn of the PC era and peaked in the mid-1980s with nearly 400 locations — were Tandy's unwinable battle. Other companies prospered by selling to corporate America through retail storefronts, but Radio Shack's computer-only effort failed to catch on. The stores were hampered by their reliance on selling solely Radio Shack brand machines.

Though the Radio Shack name keeps cash registers ringing in virtually every American community with three or more full-time residents, its magic was lost on big business. Millions of executives must have imagined having a Radio Shack computer on their desk and see it sitting right next to a stuffed animal AM/FM radio and a non-functional gateway flashlight or an inflatable beachball.

These corporate PC buyers knew exactly what Radio Shack meant, and they found it funny in relation to their business purchases.

Changing the computer brand name to Tandy didn't change this perception. For all it mattered to the Fortune 500, they might as well have used the Realistic name instead, perhaps with the slogan "Computers for the Real World."

By the time Tandy executives began to appreciate their problems, related to the decline, and Radio Shack had become an industry whipping boy.

It didn't help, of course, that buying a Tandy computer might become a lesson in how non-



standard an "IBM-compatible" computer might be. Radio Shack seemed to do everything possible to lock in customers, sometimes forcing them to buy only its accessories, add-ons, and peripherals.

IBM founder T.J. Watson would have been proud. And, in fact, Radio Shack is to the consumer electronics business what IBM has been to the computer industry. And I mean that as a compliment.

Now, Tandy is opening six superstores, the first of a national rollout if the first stores are successful. This is where the Tandy-bashing may end, because if the company can channel everything it knows about electronics retailing — which is considerable — into its Computer City Stores, then a major success could be right around the corner.

I'm among those who believe superstores will become major players in both the corporate and consumer PC markets, setting what will become the standard selling price for thousands of products and opening distribution channels that bypass the traditional middlemen.

The competition in the "superchannel," as some have begun calling the superstores, is tough. But Tandy will be in the thick of things, doing retail street fighting, which the executives in Tandy Center have always seemed to enjoy best.

So while you probably haven't bought many PCs from Tandy in the past, it shouldn't surprise you to be writing them — er, Computer City — a check in the future.

David Coursey is Dallas Bureau Chief for InfoWorld.

STATE OF THE INDUSTRY / Rachel Parker

PC buyers are becoming bargain hunters

A brand name just doesn't go as far as it used to.

InfoWorld recently got back a survey it commissioned in June to ask corporate buyers how the current price war was affecting their purchasing decisions. The survey found that among the companies that buy in large volume (500 PCs or more per year on average), a brand name, say IBM, Compaq, or in the case of laptops, Toshiba — is only worth about 17 percent more than a clone.

That's right: 17 percent. And in case you think that is a fluke, a concurrent survey of resellers confirms that brand names are worth only about 17 to 18 percent more than clones among corporate accounts.

Not very long ago, the price difference was closer to 30 or even 50 percent. As recently as late 1990, AST units sold for 30 percent less than similarly configured IBM systems, according to International Data Corp. Today, after both companies have taken price cuts and passed them along to the street, AST units are just 4 percent cheaper than similar IBM systems.

Why has this happened? The primary reason to buy a brand name over a clone has always been compatibility. Now that compatibility is easily achieved — a vendor would have to be militantly ignorant not to assure it — corporate buyers can consider other brands with confidence.

Which is not to say that differentiation is not important to corporate buyers. In the June survey, respondents said that they select a product on the basis of performance (which translates to speed), features, and warranties offered. Although price permeates all their buying decisions, it is weighed

in the context of these other factors. A vendor who offers the only 486 with a specialized hard drive will probably make a sale if that is what the corporation needs.

Depending on specific needs, a corporation may still buy lots of brand-name equipment. But, those vendors who offer the configurations shunned by IBM or Compaq will certainly pick up some customers.

For all this newfound confidence in clones, IBM and Compaq — as well as



Apple — remain corporations' preferred products when it comes to their brand-specification lists. However, our survey reflects that the real determining factor is not the brand, but the combination of price, features, and performance.

The current price war really could not have happened at a better time. Everywhere you look, discounting and price shopping are evident. Warehouse stores such as Price Club are packed each weekend with people buying the best and cracker and discount electronic goods; car buyers are using brokers to get around dealer mark ups; and in the computer business, superstores are doing a bang-up business in everything from PCs to disks and even paper clips.

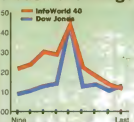
We have asked ourselves often whether the recession is affecting corporate PC purchases. Our survey indicates that the answer is no. What is affecting their buying patterns is something much closer to home: the bottom line.

Rachel Parker is InfoWorld's executive editor of news. Comments are welcome via MCI Mail (P.O. number 340-4371, or InfoWorld) or through traditional mail.

BUSINESS

STOCKS

InfoWorld 40 and the Dow Jones industrial average



The InfoWorld 40 is computed from 40 top PC stocks, based on the Wednesday closing prices, and compared to the Dow Jones Industrial average. These indexes are derived from the Dow closing price of last Dec. 31, which is represented by 100.

The InfoWorld 40 are: SYSTEMS / Apple, AST Research, Compaq, Dell, Sun Microsystems, Tandem; STORAGE / Archive, Corvus, Iomega, Master, Microplus, Seagate, Tandem; RETAILERS / Compaq, Corporate Electronics, Inc., Intel, Intelligent Electronics, JWP, Microware, Vacom; SOFTWARE / Adobe, Aldus, Ashton-Tate, Autodesk, Borland, Lotus, Microsoft, Novell, Software Publishing, Symantec; COMMUNICATIONS AND PERIPHERALS / 3Com, Celeron, Chips & Technologies, DCL, Net Systems, Network Computers, QMS, Synetics, Witek.

SOURCE: TRS INC./COMPUSE

IN BUSINESS

Intel is under the FTC's watchful eye 104

NOTES FROM THE FIELD/Robert X. Cringely

IBM votes Libertarian, declares independence from CUA and SAA

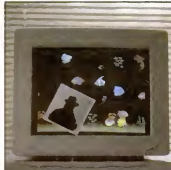
When I was a kid, my definition of independence was staying up late, eating junk food, and waiting until I thought my hair needed cutting. Thirty years later, I can do all that, yet I still don't feel independent. That's because independence really means choosing your own associates—something that most of us still can't do.

So to celebrate Independence Day properly, Pammy and I had a cookout to which we invited only people we really wanted to be with. No office politics or boring aunts and uncles, just good friends.

WITH FRIENDS LIKE THESE... My friends were the usual bunch of hackers, adult theater managers, and recovering alcoholics, while Pammy's crowd was about 15 years younger and seemed dedicated to the concept that torn clothing is good clothing. At first glance, the two groups didn't look like a good fit.

Which, of course, brings us to Apple, IBM, and Microsoft. Most of the talk recently has been about Microsoft and IBM divorcing or Apple and IBM marrying, but these complex relationships should be viewed as a unit.

Microsoft, as the jilted lover, is thinking of dropping IBM's Common



User Access (CUA) and creating its own "most descriptive" interface guidelines. Imagine two OS/2s with incompatible interfaces and maybe incompatible apps as well. Too bad for ISVs and corporate users who want to standardize.

Would young Bill do such a thing? Sure he would, but Bill is too calculating to do anything simply for spite. My guess is that he's willing to deviate from CUA because IBM is about to deviate from CUA, and maybe SAA, too, as part of its deal with Apple. All bets are off.

Forget about IBM and NextStep, too,

since Big Blue buzzes along like gale up your Next machines.

But does Apple really know what it's getting into? Sure, Sculley will finally hang out with his kinda guys, but the overhead of dealing with Big Blue will be crushing. Sytek, back when it was IBM's networking partner in the mid-'80s, found that IBM moved more MA engineers on-site than Sytek had engineers, total. Novell, which is also trying to maintain a big-time relationship with IBM, is nearly paralyzed by the sheer effort of dealing with IBM. Apple may have to rehire those 1,500 folks who were laid off, just to go for long lunches with delegations from Boca.

WIPED IN THE BUD. The day was hot. The guys were not mingling at all. I had the barbecue evenly divided between hamburgers and tofu burgers, mirroring the two unhomogenized groups of friends. My guys were buzzing about the new RISC processor DEC has running in its lab. Designed for VMS, this super-super-scalar baby is doing 180 VAX MIPS at 33 MHz.

Then Pammy appeared in a string bikini and wielding a fully automatic squirt cannon. With one burst, she

drenched me and 15 old fogies. Then she let her own crowd have it.

General pandemonium was followed by a world-class, drought-busting water fight. Pammy's crowd pulled water weapons of every type, while my friends went for wastebaskets and trash cans. It was brute force vs. finesse, and nobody won. Everyone had fun.

But conflict doesn't always lead to improved relations. Intel, which still owns the PC business, had its fight with AMD over whether the world deserves a second source for the 386, the result of which looks like major damages will be awarded to AMD. I'm talking about enormous bucks. And where is Intel in all this Apple, IBM, ACE stuff? Nowhere.

As the sun went down, we drew our names in the air with sparklers, tried to find songs we could all sing (the point of intersection seemed to be Otis Redding), and generally agreed that PC Tools Version 7.0 has some major problems.

And I thought I was a lucky number! Be independent, associate with me by calling (415) 329-3555 with an industry secret. Fax: (415) 326-0326 or cringe@mcimail.com.

BY SCOTT MACE

U.S. portable computer makers will hold their breath today as the Commerce Department decides whether to impose anti-dumping duties on Japanese companies that supply flat-panel displays for U.S. portables.

A preliminary ruling in February imposed nominal duties of 1.46 to 4.6 percent on two Japanese suppliers but absolved two others from paying any duties. If the Commerce Department imposes new duties on the importers, the International Trade Commission will hold a public hearing in Washington on July 11 to determine how the U.S. flat-panel display industry has been injured by dumping.

Since the Advanced Display Manufacturers of America (ADMA) filed its anti-dumping petition in August 1990, the Commerce Department has received volumes of testimony that fill several bookshelves. Japanese display vendors have submitted reams of information about their costs; they have been accused of understating those costs by ADMA representatives.

At a June 10 Commerce

Department hearing, personal computer companies again urged the U.S. government to split the flat-panel display industry into two parts: emissive displays, such as electroluminescent and gas-plasma displays; and nonemissive displays, such as liquid crystal displays (LCDs).

If the Commerce Department agrees, the ADMA action would probably be dismissed, as no LCDs for portable computers are being produced domestically, and emissive flat-panel displays are a niche market at this point, computer industry officials said.

The ADMA opposes the U.S. portable computer makers can substitute emissive displays for LCDs. U.S. computer makers say customers do not accept products that require such a battery-draining display.

"Virtually all of the products that are sold worldwide today in the under 7½ pound class use LCDs," said Christopher Gintz, director of technical and planning development for Compaq Computer Corp., in Houston.

To drive home their point, computer manufacturers at the

Commerce department considers new actions

- Split the panel market into two - one covering electroluminescent and gas plasma type displays, another for LCDs, more commonly used in laptops.
- New duties: would they encourage more U.S. development, or just raise prices?



hearing noted that when Commerce Department officials traveled to Japan recently they took Compaq LTE 286s, not their AC-powered, 20-pound Wang portables with gas-plasma screens.

"We wish we had domestic sources," testified Joseph Ts'ao Jr., Compaq's director of federal regulatory affairs. "The fact of the matter is that we simply can't use their products," he

added.

The hearing at times resembled an industry roundtable on the future of portables. Computer makers and U.S. display makers tried to guess how feasible and popular color laptops will be in the next few years and whether duties on Japanese companies now would encourage color LCD development or just drive U.S. portable computer makers offshore.

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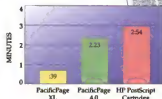


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